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ASSESSING DIETARY INTAKES

Final Report: A Comparison of the Food Frequency with Standard Methods for Quantifying Dietary Quality

Helen A. Guthrie and Helen S. Wright
with
James Krebs-Smith and Susan M. Krebs-Smith

Final Report for Contract 58-3198-2-57,
The Human Nutrition Information Service,
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FOREWORD

This report covers the third and final phase of work under contract 58-3198-2-57 with the Human Nutrition Information Service, Consumer Nutrition Center, U.S. Department of Agriculture. The purpose of the overall project was to examine abbreviated measures of dietary quality. In the first two phases, we explored a simple scoring measure and a dietary variety measure. This phase of the project was designed to compare selected dietary quality measures derived by a standard method, that is, from nutrient analysis of all recorded food items, with those derived from analysis of a food frequency tally.

Since the standard method of evaluating dietary intakes involves precise determinations of nutrient intakes based on the qualitative and quantitative characterization of all foods eaten, it is both time-consuming and expensive. Furthermore, because it usually measures food consumption during a limited period of time in order for respondents to provide more accurate records, it may not describe habitual intake.

These limitations of the standard method have resulted in considerable interest in abbreviated methods which will save time and money during collection and/or processing and which will provide information on usual dietary intake. The food frequency is designed for the latter purpose - to give information about usual intake. A major concern about the food frequency, however, is that it lacks sufficient specificity in describing the actual foods and amounts of foods eaten to provide adequate quantitative information about nutrient intakes.

Therefore, our task under the final phase of this project was to compare dietary quality indices derived by counting the number of

mentions from each of many food groups to those derived by the standard method. It was felt that such a comparison could be used to determine whether food frequency tallies provide sufficient information to quantify nutrient intakes. The purpose of this report is to outline our study design, detail our methods, describe our results and discuss the implications for future research.

SUMMARY

In this project, we compared nutrient intakes and dietary quality measures derived from food group frequencies with those derived from detailed analyses of three-day recall/records. We refer to the latter analysis as the "standard" method. We used three-day food records from the 1977-78 Nationwide Food Consumption Survey (NFCS). This data base enabled us to compare the two methods for a large number of sex-age groups.

We developed 66 food groups from the NFCS food codes. A major criterion in the development was that groups be similar in nutrient, sugar, and calorie content so that each presented a distinctive nutrient profile. Another factor in the development of the groups was that they be based on the way foods are used, as well as their nutrient profiles. We considered that criterion to be an important one for eliciting information via food frequency questionnaires.

Nutrient profiles were developed for each of the food groups. The profiles were based on nutrient composition and common serving size data for each of the major food codes in each group. We made the decision to consider one set of food group nutrient profiles for all sex-age groups, reasoning that this would be the most abbreviated, efficient procedure for analyzing these data. This decision influenced the nutrient profiles in two ways. First, determination of the major food codes in each group was based on food use for the total population, without regard for age, sex or any other variable. Second, a single serving size value was identified for each of the major food codes--again, without regard for age or sex.

We compared the food frequency and standard methods by examining means for, and correlation coefficients for the relationships between, the following measures: nutrient adquacy ratios (NARs), a mean adequacy ratio for 11 nutrients (MAR11) and the percent of calories from protein, fat and carbohydrate. We also compared the percent of people who would be categorized at <.60 or ≥.80 for the NARs and the MAR11 by the two methods. Finally, we used the methods to identify problem nutrients.

In this study, the food frequency was more abbreviated than the standard method in two ways: a reduction in the number of items analyzed and a lack of serving size specificity. The fundamental purpose of this study was to explore how much information is lost by using such abbreviations.

While nutrient-by-nutrient differences were evident in comparing these two methods, the more compelling differences appeared to be among sex-age groups. In general, the food frequency overestimated the nutrient intakes of children and underestimated those of adolescent and adult males. Considering the direction of these differences, the most probable explanation for this is that sex-age groups differ in the quantities of various foods which they consume.

The food frequency holds considerable promise as a method of determining usual food intake, and also as an abbreviated method of evaluating dietary quality. Results from the food frequency and standard methods differed, but these differences appear to be due primarily to the use of a common serving size across sex-age groups. The comparability of these two methods should be further examined by refining the nutrient profiles via serving size adjustments for different sex-age groups.

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ACKNOWLEDGEMENTS

This report covers the final phase of work under contract 58-3198-2-57 with The Human Nutrition Information Service, Consumer Nutrition Center, U.S. Department of Agriculture.

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INTRODUCTION

This report covers the final phase of work under contract with The Human Nutrition Information Service, Consumer Nutrition Center, U.S. Department of Agriculture. The objective of the final phase was to compare selected dietary quality measures derived from nutrient analysis of all recorded food items with those derived from a food frequency analysis. Food intake data for both of the analyses were obtained from the three-day food recall/records of individual household members participating in the 1977-78 Nationwide Food Consumption Survey (NFCS).

The purpose of this report is to provide background material for the project, to describe our study design and detail our methods, and to present our results and a discussion of the findings, with implications for further study.

BACKGROUND/STUDY DESIGN

Background. The standard method of evaluating dietary intakes is time-consuming and expensive. It involves precise determinations of nutrient intakes, based on characterizing qualitatively and quantitatively all foods eaten, and calculating the nutritive contribution of each food. Furthermore, because it measures food consumption during a limited period of time in order for respondents to keep more accurate records, it may not describe usual dietary intake. Because of these limitations, there has been considerable interest in developing abbreviated methods which will save data collection time and money as well as provide information on habitual dietary intake.

Riddick (1) described any method which decreases the magnitude of collection, processing, or analysis of data to be an abbreviated or short method. The search for such methods has been going on since 1918 (2-9). Investigators have considered a variety of approaches to shorten methods, including the use of food scoring systems to shorten the processing phase (5) and food frequency questionnaires to abbreviate both collection and processing phases (6,7,8).

Food frequency questionnaires have been widely used for counselling patients and in epidemiological studies. A major limitation of such questionnaires is the lack of quantitative information. Several investigators have explored how well results of food frequency questionnaires compare with results of other methods of evaluating nutrient intakes.

Crepin et al. (9) reported on a short method of dietary assessment using a stepwise regression analysis of food group ingestion frequencies to predict nutrient intake values. The food group frequencies were

derived from 3-day dietary records of adult males and females. While their method was able to eliminate serving size information and detailed food descriptions in predicting nutrient values, it is unclear whether it significantly reduced the complexity of data analysis. Different equations were required to predict the intake of each nutrient--equations which varied in the number of food groups represented and which required separate correlation coefficients for each food group. The investigators considered the results to be promising enough to justify further examination of factors that could affect the predictive value of the equations.

Yarnell et al. (8) took a different approach to consider nutrient estimates derived from a food frequency questionnaire. They compared a short self-administered questionnaire designed to assess average weekly nutrient composition with seven-day weighed records for 119 adult men. They derived average portion sizes on the basis of weighed dietary records for the group as a whole. The principle objective of their study was to examine nutritional determinants of ischemic heart disease, for example, fiber, fat, saturated fat, protein, alcohol. They reported that, with the exception of alcohol and cereal fiber, the questionnaire estimates were lower than those for weighed records. They suggested that improvements could be achieved through accurate estimates of individual portion sizes, but that such a procedure would increase the cost of data collection. Finally, they stated that validation of the questionnaire would require a larger data set.

While there is a growing interest in the use of food frequency questionnaires, they have not been sufficiently evaluated to support their use as a basis for quantifying nutrient intakes and assessing

dietary quality. We proposed to use the Nationwide Food Consumption Survey (NFCS) food recalls and records, to compare nutrient intakes and dietary quality measures derived from detailed analysis of three-day records/recalls with those derived from food group frequencies. Like Crepin et al., we derived our food frequency information from the three-day recall/records. In a manner similar to that of Yarnell et al., we assumed a common serving size for each food group. Unlike either of these two studies, however, we developed nutrient profiles for each food group to predict nutrient intake. Furthermore, we compared the food frequency to the standard method in terms of each methods' assessment of the dietary quality of our study population. Our procedure is presented in the following discussion of study design and methods.

How?

Study Design. The design of this project involved scoring food recalls and records from the NFCS--by counting the number of mentions of certain food groups--in order to generate quantitative estimates of nutrient intake and dietary quality. These estimates were then compared to similar measures obtained from the more detailed analysis of 3-day recall/records.

Inherent in this approach is the assumption that much of the detail in the 3-day recall/records is unnecessary in estimating nutrient intake. Thus, while the NFCS discriminates among more than 4500 distinct food items, foods with similar nutrient composition can be thought of as making equivalent contributions to dietary intake. And, while reported serving sizes may vary somewhat from meal to meal and from person to person, if foods are grouped according to the ways in which they are used, then these differences are likely to be diminished.

Our procedure involved the distillation of detailed food recall/records down to simple tallies of the number of servings per day from each of several food groups. Estimates of the average daily intake of each nutrient were generated by ascribing a profile of nutrient values to single servings of each of the food groups, multiplying these nutrient values by the number of servings of each food group, and summing the values--contributed by all the food groups--for each nutrient.

METHODS

As preliminary steps, we selected a study population, developed the food groups, assigned the food mixture codes to multiple groups, and constructed a nutrient profile for each group. We then determined the frequency with which each person reported the items in various food groups, and used these food frequency scores along with the nutrient profiles to estimate nutrient intake and dietary quality. Finally, we compared these estimates of dietary quality to values determined from the more detailed analyses.

Selection of the Study Population. In the NFCS sample of households, criteria for asking individuals to participate differed by season. In the spring portion, all persons in each household were asked to provide information of food intake. In the other three seasons, only half of those persons 19 years of age and older were asked to participate, except those in single-person households who were asked to participate regardless of age. Proportional representation was maintained in these other seasons by double-counting each record for an individual 19 years of age and older, except for those from single-person households. Additional weighting factors were applied to all individuals in the survey to account for non-respondent households. Three-day food records were obtained from 28,030 individuals (36,255 weighted) (10). In order to save costly computer time, we decided to analyze only a subsample of that population.

Our study population represents a stratified sample of the NFCS population, minus pregnant and lactating females and children under one year of age. We selected a straight 10 percent random sample from the unweighted spring portion of NFCS. For the other seasons, we had to

adjust for an appropriate age distribution. In these other seasons, we took a 10 percent random sample of all persons under 19 years of age and a 20 percent random sample of all persons 19 years of age and older, regardless of household size. Exclusions from the sample were made after the sample was drawn.

Table 1 shows a comparision of the sex/age distribution in our study population with the weighted count of individuals from the NFCS population (10) who were over one year of age and for whom three days of food records were available. Figures for the NFCS population include pregnant and lactating women. Overall, the distributions are similar, with the proportions for each age/sex category being equivalent to within 1.5 percent.

Development of Food Groups. Based on similarities in nutrient composition, calorie and sugar content, and ways in which foods are used, we divided the NFCS codes into 68 discrete food groups. The advantage of this many food groups is that each is composed of a truly homogeneous set of foods and presents a distinctive nutrient profile.

Table 2 displays the list of food groups. There are separate milk groups for each level of fat and for flavored milks. Also, milk used as a condiment (such as in coffee) is distinguished from that used as a beverage. Cottage cheese is separated from other cheeses because of its lower calcium, and higher sodium and protein, content per serving.

Beef, pork, other meats, and poultry are all represented by different groups, including separate categories for trimmed and untrimmed cuts. Organ meats from all carcass varieties are grouped together because of their unique concentration of vitamins A and B12, iron, and cholesterol. Likewise, all kinds of sausages and luncheon meats are

(Text continues on page 10)

TABLE 1

Sex-Age Distribution of the Present Study Population, Compared With the Weighted Count from NFCS Over One Year of Age

Sex and Age (years)	Present study Population	NFCS Population
	← % →	
Males and females:		
1-2	2.6 (98)*	2.9
3-5	4.6 (172)	4.8
6-8	4.9 (183)	5.2
Males:		
9-11	2.4 (90)	2.6
12-14	3.0 (111)	3.2
15-18	4.2 (157)	3.9
19-22	3.1 (115)	2.9
23-34	7.7 (286)	7.6
35-50	7.6 (280)	7.2
51-64	5.7 (212)	6.0
65-74	3.0 (112)	2.9
75 and over	1.7 (62)	1.3
Females:		
9-11	3.0 (109)	2.8
12-14	2.7 (99)	3.2
15-18	3.7 (138)	4.1
19-22	3.2 (118)	3.7
23-34	10.8 (401)	10.9
35-50	9.5 (350)	10.5
51-64	8.0 (297)	8.2
65-74	5.2 (191)	3.9
75 and over	3.2 (120)	2.1
Total:	100.0 (3701)	100.0

*Numbers in parentheses indicate number of persons.

TABLE 2

List of Food Groups

Whole milk	Citrus fruit and juice
Lowfat milk	Melon, berries
Skim milk	Other fruit and juice
Flavored milk	
Milk as condiment	Plain potatoes
Yogurt	Fried potatoes
Cheese (except cottage)	Tomatoes
Cottage cheese	Tomato sauce
Frozen dairy desserts	Condiments
Cream pies, cheescake	Dark green, deep yellow vegetables
Puddings, custards	Other vegetables
Beef	Cream soups
Beef, trimmed	Other soups
Pork	
Pork, trimmed	Fatty meats
Other meats	Creams
Other meats, trimmed	Sauces, gravies
Poultry	Regular salad dressings
Poultry, skinned	Diet salad dressings
Organ meats	Spreads, dips
Sausage, luncheon meats	Oils, cooking fat
Fish, shellfish	
Eggs	Sugars, syrup, jellies
	Gelatin dessert
Dried beans and peas	Popsicles
Nuts, seeds	Candy
	Sugar-based beverages
Soy-based supplement	
Milk-based meal replacement, diet supplement	Diet soda
	Coffee, tea
White bread	Alcoholic beverages
Whole grain yeast bread	
Quick breads, tortillas	Human milk*
Pancakes, French toast	Baby formulas*
Grain-based snacks	
Low sugar ready-to-eat cereal	
Medium sugar ready-to-eat cereal	
High sugar ready-to-eat cereal	
Cooked breakfast cereal	
Pasta, rice	
Cookies	
Rich grain-based desserts	

*Not mentioned by our study population.

(continued from page 7)

clustered together because of their relatively high fat and sodium content. Fish and shellfish are together in a single group, as are all eggs.

Yeast breads are divided into white and whole grain, in recognition of their differences in vitamin and mineral content. Breakfast cereals, however, are separated on the basis of added sugar--because fortification practices make the micronutrient composition of many cereals similar, regardless of the extent of milling. "Grain-based" snacks include popcorn, pretzels and crackers. Cookies are separated from the richer grain-based desserts, such as cakes, pies, and pastries.

Fruits and vegetables are categorized into ten groups. Citrus fruit is distinguished for its unique contribution of folacin* and vitamin C; melons and berries are also noted for their vitamin C, but they are used much less often than are citrus fruits. Potatoes are distinctive for their contribution of complex carbohydrate to the diet, as well as for their wide use. Dark green and deep yellow vegetables are considered together, apart from other vegetables, because of their high carotene content.

Foods that contribute calories mainly from fat are grouped according to the ways in which they are used. Fatty meats include bacon and salt pork. Sweet dairy creams, as well as non-dairy creamers and whipped toppings, make up the creams group. Regular salad dressings are separated from diet salad dressings because of their higher fat content. Spreads and dips include butter and margarine, sour cream, cream cheese

*Folacin data were not available for the NFCS codes used in this analysis. However, this distinguishing feature of citrus fruit may be of interest in future analyses, where folacin data are available for similar groups of food.

and guacamole.

Foods that contribute most of their calories from sugar are also grouped according to ways in which they are used. Sugars, sirups and jellies; gelatin desserts; popsicles; sugar-based beverages; and all kinds of candy are each represented by separate groups.

In order to construct these discrete food groups, we had to disregard for the moment codes representing food mixtures, such as sandwiches (see next subsection for handling of the food mixtures). Also, a relatively small number of codes were omitted from the analysis. But, as can be seen in Appendix A, codes were omitted only if they:

- o represented foods of insignificant nutrient composition (e.g. spices and herbs)
- o were developed for the Puerto Rican supplemental survey, which is not included in this study (e.g. Puerto Rican style beef stew)
- o represented food mixtures of indeterminate composition (e.g. hors d'oeuvres)

Appendix B lists all of the food codes, and their descriptions, included within each food group. This list excludes all omitted codes (Appendix A) as well as those codes representing food mixtures (Appendix C). This latter group of codes is discussed in the following section.

Handling of the Food Mixtures. In the NFCS, food items were coded as reported. For example, "buttered peas" appearing on one line of a food record was coded as a single food, whereas "peas" on one line and "butter" on another line were designated by two separate codes. Casseroles and sandwiches, if reported as such, were assigned distinct codes which classified them according to their predominant ingredient.

For this project, however, we felt it was necessary to account for the components of food mixtures as much as possible. For example, in order to get a truer count of the frequency with which cheese was reported, we felt we had to count the cheese contained in sandwiches, pizzas, and casseroles, as well as that reported separately. Also, it seemed inappropriate to consider any food mixture as a serving of only one food item when, in fact, it was composed of more than one food. For these reasons, we reviewed the codes which represented food mixtures and, for each, identified which food groups should be tallied for a serving of the mixture. Appendix C lists all the food codes, and their descriptions, which were counted in multiple food groups.

The food mixtures were assigned to multiple groups, as appropriate, only for the purposes of tallying the number of servings from each group. The food mixture codes are not represented in the nutrient profile for each group. For example, while a "hamburger on bun" was tallied as a serving of beef and a serving of white bread, the nutrient values for this sandwich were not used in computing the nutrient profile for either the beef group or the white bread group. This is because there is no way to ferret out of the nutrient values for "hamburger on bun" the exact proportion of each nutrient contributed by the beef and by the bread.

Thus, all codes were either assigned to one of the 68 food groups, omitted from the analysis, or assigned to multiple food groups. In effect, this distribution of the codes established 68 new variables on which frequencies were later tallied for each subject. But, prior to that, nutrient profiles were developed to represent a single serving of each food group.

Construction of the Nutrient Profiles. Before we could estimate nutrient intake from the food frequency score, we first needed to develop a composite nutrient profile to represent a single serving of each food group. Each nutrient profile represents a weighted average of those nutrient values which correspond to single servings of the major food codes in that group.

Thus, construction of the nutrient profiles involved three steps: 1) determining the major food codes in each food group; 2) establishing an appropriate serving size for each major food code; and 3) deriving a weighted average of the nutrient values, based on each food code's contribution to the food group's total number of mentions.

1) We decided to include only the most frequently mentioned foods within each group in the derivation of the nutrient profiles. This allowed a reduction in the number of foods used in developing each profile to a more manageable size, while still providing a sufficient degree of representation. For most groups, this meant including foods which accounted for approximately 90 to 95 percent of the total mentions in that group. The net effect was to reduce the number of food codes to be used in calculating the nutrient profiles by 70 percent (i.e.,from 2665 to 791 codes).

Once assigned to a food group, the relative contribution of each code toward its respective group was determined. As stated previously, we excluded all codes representing food mixtures in deriving the nutrient profiles.

After generating the food code frequencies, we reduced the number of food groups from 68 to 66. Two food groups (human milk and baby formula) dropped out because there were no mentions from

either group by the study population. This was not unexpected since children under one year of age were excluded from study.

2) After determining the contribution of each code toward the total number of mentions within its respective food group, we identified a serving size for each of these major codes to use in calculating the nutrient profiles.

The publication by Pao et al, "Foods commonly eaten by individuals: amounts per day and per eating occasion," (11) became our primary source of serving size information. Based on 1977-78 NFCS data, this publication presents tables for 200 food items and food groups, showing the number and proportion of individuals who reported using each food, the number of occasions during the 3-day period on which they ate the food, and the quantities eaten per occasion and per day. Specifically, we utilized data on the quantity consumed per eating occasion at the 50th percentile for the total weighted sample.

Since Pao et al provided information on only the most frequently reported foods, we turned to the NFCS Coding Manual to further aid us in assigning serving sizes to less frequently mentioned foods. On the occasion that an NFCS participant inadequately described (on their food record) the amount in which a food was eaten, a portion size from the coding manual would be assigned. Listed in the manual under the column heading "serving not specified," these amounts served as a secondary source of serving size information.

Appendix D lists the most frequently mentioned foods in the remaining 66 food groups. Also shown is each item's frequency, its

relative contribution toward the total mentions within its respective group, and the assigned serving size.

3) Weighting factors for each code contributing to a nutrient profile were based on the frequency with which that code was mentioned. Having established cut-off points for each group, the percent contribution of each code was adjusted so the group total again equaled 100 percent. The following example, using hypothetical data, illustrates this procedure:

Food Group: Melons and Berries

Food	Percent of Mentions	
Strawberries	35.2	
Cantaloupe	21.5	
Watermelon	21.2	
Honeydew	4.8	
Cranberries	4.5	
Strawberries, frozen	2.7	
----------		Cut-off for most frequently
Casaba	2.4	mentioned foods = 89.9%
Raspberries	2.4	
Blueberries	1.8	
Blueberries, frozen	1.4	
Cantaloupe, frozen	1.2	
Boysenberries	0.9	
Total	100%	

$\frac{100\%}{89.9\%}$ = 1.11 (Food Group Weighting Factor)

	Percent of Mentions	x	Food Group Weighting Factor	=	Adjusted Percent of Mentions
Strawberries	35.2		1.11		39.2
Cantaloupe	21.5		1.11		23.9
Watermelon	21.2		1.11		23.6
Honeydew	4.8		1.11		5.3
Cranberries	4.5		1.11		5.0
Strawberries, frozen	2.7		1.11		3.0
					100.0%

The subsequent steps in deriving the nutrient profiles are illustrated in Table 3. The "adjusted percent of mentions" was, in turn, multiplied by the assigned serving size to obtain a food code weighting factor. Then, to calculate the energy and nutrient contribution of each code toward its respective group, this food code weighting factor was multiplied by the nutrient values per 100 grams of the food. Summing of these values resulted in a composite of the nutrients contributed by the individual foods which we have termed a group's "nutrient profile." Appendix E shows the nutrient profile for each of the 66 food groups.

Tally of Food Group Frequencies. The next step toward the estimation of nutrient intakes was to count each person's number of mentions from each food group from their 3-day record. Each food mentioned was considered a full serving, and each food mixture was counted as a full serving from each food group which the mixture represented. Lasagna, for example, was counted as a serving from the cheese, beef, pasta/rice, and tomato sauce food groups. This tally, then, resulted in a set of totals--each representing a person's total number of servings from a particular food group.

What does this do? Reduce nutrient levels of mixture people.

Estimation of Dietary Quality. Subsequently, we multiplied each of these food group totals by the nutrient profile of their corresponding food group. This generated a value for the energy and fourteen nutrients contributed by each group from which a person had mentioned one or more food items. By summing the values from all food groups for energy and each of the fourteen nutrients, we arrived at an estimation of each individual's three-day intake. These three-day intakes were then divided by three to provide three-day averages for energy and each of the nutrients.

TABLE 3

Procedure for Deriving Nutrient Profiles, Demonstrated with Melons and Berries Group*

Food Code (f)#	Adjusted Percent of Mentions	Serving Size	Food Code Weighting Factor	Energy	Pro	Fat	Cho	Ca	Fe	Mag	Phos	Vit A	Thia	Ribo	Niac	Vit B6	Vit B12	Vit C
		gm.		Kcal	gm.	gm.	gm.	mg.	mg.	mg.	mg.	I.U.	mg.	mg.	mg.	mg.	mcg.	mg.
632-2301 (118) Strawberries, raw	39.2	75	29.4	10.9	.21	.15	2.5	.006	.29	3.52	6.17	17.6	.009	.020	.18	.015	0	17.3
631-0901 (72) Cantaloupe	23.9	136	32.5	9.7	.23	.03	2.4	.005	.13	5.20	5.20	1105.0	.013	.010	.09	.029	0	10.7
631-4901 (71) Watermelon	23.6	426	100.5	26.1	.50	.20	6.4	.007	.50	8.04	10.06	592.9	.030	.030	.20	.070	0	7.0
631-2701 (16) Honeydew	5.3	149	7.9	2.6	.06	.02	0.6	.001	.03	1.26	1.26	3.2	.003	.002	.05	.005	0	1.8
632-0711 (15) Cranberries	5.0	35	1.8	3.2	0	.01	0.8	0	0	.07	.09	.4	0	0	0	0	0	0
632-2360 (9) Strawberries, frozen	3.0	128	3.8	4.1	.02	.01	1.1	.001	.03	.34	.65	1.1	.001	.002	.02	.001	0	2.0
Totals	100.0			56.6	1.02	.42	13.8	.020	.98	18.43	23.43	1720.2	.056	.064	.64	.120	0	38.8

*For this example, only data from spring sample were used. Therefore, these numbers do not represent the actual Melons and Berries profile.

#(f) = frequency of mention

Dietary quality was assessed by two measures of nutrient adequacy (Nutrient Adequacy Ratios and Mean Adequacy Ratio), and by the number of calories and the percent of calories from fat, protein and carbohydrate. Nutrient Adequacy Ratios (NARs) were calculated for ten nutrients (protein, calcium, iron, magnesium, phosphorus, vitamin A, thiamin, riboflavin, vitamin B12, and vitamin C) according to the following equation:

$$\text{NAR} = \frac{\text{Individual's 3-day average intake of a nutrient}}{\text{RDA for that nutrient}}$$

Another NAR was calculated for vitamin B6 but the value listed in the RDA table was not used as the denominator. Instead, we used 0.02 mg vitamin B6 per gram of protein intake. This calculation is the basis of the current RDAs; however, the RDA table values were set at 2.0 and 2.2 mg for adults, on the assumption that many adults consume up to 100 and 110 grams of protein. These table values may therefore tend to overestimate inadequate B6 intake levels (12).

A Mean Adequacy Ratio 11 (MAR11) was calculated by adding the three-day average percent RDA (truncated at 100 percent), for each of eleven nutrients and dividing the sum by 11. Therefore, an MAR11 of 100 represents 100 percent of the RDA for all nutrients included in the score.

Comparison of Dietary Quality Measures Obtained by Both Methods. To determine the validity of this food frequency tally for assessing dietary quality, we compared the dietary quality measures determined by that method with similar measures obtained by the standard method of

evaluating 3-day records. We made these comparisons in three general ways and, in each instance, results were analyzed according to the current RDA sex-age groups plus an additional category for persons over 70 year of age. First, for each of the dietary quality measures--each NAR, the MAR11, energy, and the percent of calories from protein, fat, and carbohydrate--we compared the mean value determined by the food frequency method to that determined by the standard method. Along with this, we looked at the correlation coefficients between the 2 methods for each dietary quality measure. Secondly, for each NAR, the MAR11 and the percent of calories for fat, we compared the percent of persons which would be classified by the two methods as being above or below certain cut-off points. Finally, we identified "problem" nutrients for each sex-age group, using both methods and compared the results. In this study, a "problem" nutrient is one for which the mean NARs are <.70 for a particular group of individuals. The results of all of these ways of comparing the two methods are discussed in the next section.

RESULTS

Mean Values and Correlation Coefficients. Tables 4 through 14 compare each nutrient's mean NAR, as calculated by both the standard and food frequency methods, for each sex-age category. Also shown on these tables are the correlation coefficients for the relationship between the NARs derived by the two methods, for each sex-age group.

Mean NARs for protein are ubiquitously high for all sex-age groups, and are virtually identical as determined by the two different methods. Correlation coefficients of zero for the two youngest age groups reflect the absence of any deviation from the mean NARs of 1.00 in these groups when determined by the food frequency method. Among adolescents and adults, correlations range from .47 to .77 for males and from .69 to .78 for females.

Comparing the mean calcium NARs for the two methods, the food frequency approach tends to overestimate adequacy by a small margin for children aged one through six, and to underestimate adequacy for males aged 11 through 69. For females, mean calcium NARs determined by the two methods are similar. Correlations are high for all sex-age groups, ranging from .77 for seven to ten year olds to .90 for females aged eleven to fourteen.

Mean NARs for iron are overestimated for young children by the frequency method, being .18 and .10 higher, respectively, for those one to three and four to six years. Conversely, this method underestimates adequacy in 11 to 14 and 15 to 18 year old males by .07 and .14 respectively. Correlations for children and males aged 23 to 50 are less than .50. Those for all other sex-age groups range from .59 to .75.

(Text continued on page 32)

TABLE 4

Mean Protein NAR for each Sex-Age Category as Determined by Standard and Food Frequency Methods, and Correlation Coefficients for the Relationship Between the NARs Determined by These Two Methods

Sex and Age (years)	n	Method of Determining Protein NAR: Standard	Food Frequency	Correlation Coefficient
		mean protein NAR ± standard deviation		
Males and females				
1-3	151	1.00 ± 0.04	1.00 ± 0.00	.00
4-6	179	1.00 ± 0.02	1.00 ± 0.00	.00
7-10	260	1.00 ± 0.02	1.00 ± 0.03	.12
Males				
11-14	135	0.99 ± 0.04	0.99 ± 0.06	.77
15-18	157	0.99 ± 0.06	0.98 ± 0.08	.57
19-22	115	0.98 ± 0.08	0.96 ± 0.10	.57
23-50	566	0.99 ± 0.05	0.97 ± 0.08	.47
51-69	269	0.97 ± 0.10	0.96 ± 0.10	.57
70+	117	0.96 ± 0.10	0.96 ± 0.10	.64
Females				
11-14	137	0.99 ± 0.03	0.99 ± 0.04	.69
15-18	138	0.97 ± 0.11	0.97 ± 0.10	.73
19-22	118	0.96 ± 0.12	0.96 ± 0.11	.69
23-50	751	0.95 ± 0.13	0.96 ± 0.12	.78
51-69	405	0.96 ± 0.11	0.97 ± 0.10	.76
70+	203	0.96 ± 0.11	0.97 ± 0.10	.77

TABLE 5

Mean Calcium NAR for each Sex-Age Category as Determined by Standard and Food Frequency Methods, and Correlation Coefficients for the Relationship Between the NARs Determined by These Two Methods

Sex and Age (years)	n	Method of Determining Calcium NAR: Standard	Method of Determining Calcium NAR: Food Frequency	Correlation Coefficient
		mean calcium NAR ± standard deviation		
Males and females				
1-3	151	0.80 ± 0.24	0.90 ± 0.19	.85
4-6	179	0.84 ± 0.21	0.90 ± 0.17	.85
7-10	260	0.91 ± 0.15	0.92 ± 0.15	.77
Males				
11-14	135	0.81 ± 0.22	0.77 ± 0.23	.87
15-18	157	0.78 ± 0.24	0.67 ± 0.25	.86
19-22	115	0.84 ± 0.23	0.73 ± 0.25	.84
23-50	566	0.81 ± 0.22	0.70 ± 0.25	.81
51-69	269	0.76 ± 0.25	0.70 ± 0.27	.84
70+	117	0.76 ± 0.23	0.76 ± 0.24	.82
Females				
11-14	137	0.72 ± 0.23	0.71 ± 0.23	.90
15-18	138	0.60 ± 0.27	0.56 ± 0.25	.88
19-22	118	0.70 ± 0.26	0.66 ± 0.27	.89
23-50	751	0.63 ± 0.27	0.62 ± 0.26	.88
51-69	405	0.65 ± 0.25	0.67 ± 0.25	.86
70+	203	0.68 ± 0.23	0.71 ± 0.23	.81

TABLE 6

Mean Iron NAR for each Sex-Age Category as Determined by Standard and Food Frequency Methods, and Correlation Coefficients for the Relationship Between the NARs Determined by These Two Methods

Sex and Age (years)	n	Method of Determining Iron NAR: Standard	Method of Determining Iron NAR: Food Frequency	Correlation Coefficient
		mean iron NAR ± standard deviation		
Males and females				
1-3	151	0.57 ± 0.20	0.75 ± 0.16	.48
4-6	179	0.88 ± 0.14	0.98 ± 0.06	.41
7-10	260	0.95 ± 0.11	0.98 ± 0.07	.42
Males				
11-14	135	0.78 ± 0.20	0.71 ± 0.17	.71
15-18	157	0.83 ± 0.18	0.69 ± 0.17	.70
19-22	115	0.96 ± 0.11	0.92 ± 0.15	.59
23-50	566	0.99 ± 0.05	0.95 ± 0.10	.48
51-69	269	0.96 ± 0.12	0.93 ± 0.14	.65
70+	117	0.96 ± 0.08	0.95 ± 0.10	.61
Females				
11-14	137	0.65 ± 0.17	0.65 ± 0.15	.61
15-18	138	0.62 ± 0.21	0.59 ± 0.18	.75
19-22	118	0.58 ± 0.20	0.53 ± 0.17	.74
23-50	751	0.58 ± 0.20	0.57 ± 0.18	.75
51-69	405	0.91 ± 0.15	0.93 ± 0.14	.71
70+	203	0.89 ± 0.15	0.92 ± 0.14	.69

TABLE 7

Mean Magnesium NAR for each Sex-Age Category as Determined by Standard and Food Frequency Methods, and Correlation Coefficients for the Relationship Between the NARs Determined by These Two Methods

Sex and Age (years)	n	Method of Determining Magnesium NAR: Standard	Food Frequency	Correlation Coefficient
		mean magnesium NAR ± standard deviation		
Males and females				
1-3	151	0.92 ± 0.15	0.99 ± 0.05	.50
4-6	179	0.87 ± 0.16	0.96 ± 0.08	.63
7-10	260	0.85 ± 0.17	0.88 ± 0.15	.62
Males				
11-14	135	0.77 ± 0.21	0.70 ± 0.19	.80
15-18	157	0.73 ± 0.21	0.57 ± 0.17	.79
19-22	115	0.74 ± 0.21	0.58 ± 0.19	.75
23-50	566	0.80 ± 0.18	0.64 ± 0.19	.68
51-69	269	0.77 ± 0.21	0.66 ± 0.21	.73
70+	117	0.74 ± 0.20	0.70 ± 0.20	.74
Females				
11-14	137	0.75 ± 0.19	0.73 ± 0.18	.77
15-18	138	0.69 ± 0.23	0.65 ± 0.21	.83
19-22	118	0.64 ± 0.22	0.60 ± 0.20	.81
23-50	751	0.68 ± 0.22	0.65 ± 0.20	.80
51-69	405	0.74 ± 0.20	0.74 ± 0.20	.72
70+	203	0.72 ± 0.19	0.73 ± 0.19	.72

TABLE 8

Mean Phosphorus NAR for each Sex-Age Category as Determined by Standard and Food Frequency Methods, and Correlation Coefficients for the Relationship Between the NARs Determined by These Two Methods

Sex and Age (years)	n	Method of Determining Phosphorus NAR: Standard	Food Frequency	Correlation Coefficient
		mean phosphorus NAR ± standard deviation		
Males and females				
1-3	151	0.91 ± 0.16	0.98 ± 0.07	.65
4-6	179	0.95 ± 0.10	0.99 ± 0.03	.50
7-10	260	0.98 ± 0.06	0.99 ± 0.05	.39
Males				
11-14	135	0.94 ± 0.12	0.92 ± 0.13	.81
15-18	157	0.95 ± 0.12	0.89 ± 0.16	.69
19-22	115	0.97 ± 0.10	0.96 ± 0.10	.69
23-50	566	0.99 ± 0.05	0.97 ± 0.09	.51
51-69	269	0.97 ± 0.10	0.95 ± 0.12	.63
70+	117	0.97 ± 0.08	0.97 ± 0.10	.64
Females				
11-14	137	0.89 ± 0.16	0.90 ± 0.15	.82
15-18	138	0.82 ± 0.21	0.80 ± 0.20	.79
19-22	118	0.93 ± 0.15	0.92 ± 0.15	.74
23-50	751	0.91 ± 0.16	0.91 ± 0.15	.75
51-69	405	0.92 ± 0.15	0.94 ± 0.14	.73
70+	203	0.93 ± 0.14	0.95 ± 0.11	.71

TABLE 9

Mean Vitamin A NAR for each Sex-Age Category as Determined by Standard and Food Frequency Methods, and Correlation Coefficients for the Relationship Between the NARs Determined by These Two Methods

Sex and Age (years)	n	Method of Determining Vitamin A NAR: Standard	Food Frequency	Correlation Coefficient
		mean vitamin A NAR ± standard deviation		
Males and females				
1-3	151	0.95 ± 0.13	0.98 ± 0.06	.42
4-6	179	0.90 ± 0.18	0.95 ± 0.13	.75
7-10	260	0.88 ± 0.19	0.89 ± 0.17	.64
Males				
11-14	135	0.79 ± 0.27	0.71 ± 0.25	.77
15-18	157	0.79 ± 0.26	0.67 ± 0.26	.74
19-22	115	0.70 ± 0.29	0.55 ± 0.28	.74
23-50	566	0.77 ± 0.26	0.62 ± 0.28	.70
51-69	269	0.79 ± 0.27	0.71 ± 0.28	.73
70+	117	0.79 ± 0.26	0.74 ± 0.26	.75
Females				
11-14	137	0.80 ± 0.24	0.78 ± 0.24	.71
15-18	138	0.73 ± 0.29	0.68 ± 0.26	.71
19-22	118	0.72 ± 0.29	0.64 ± 0.27	.73
23-50	751	0.74 ± 0.28	0.70 ± 0.28	.75
51-69	405	0.83 ± 0.24	0.80 ± 0.25	.72
70+	203	0.85 ± 0.22	0.82 ± 0.23	.72

TABLE 10

Mean Thiamin NAR for each Sex-Age Category as Determined by Standard and Food Frequency Methods, and Correlation Coefficients for the Relationship Between the NARs Determined by These Two Methods

Sex and Age (years)	n	Method of Determining Thiamin NAR: Standard	Food Frequency	Correlation Coefficient
		mean thiamin NAR ± standard deviation		
Males and females				
1-3	151	0.96 ± 0.08	1.00 ± 0.02	.32
4-6	179	0.95 ± 0.10	1.00 ± 0.02	.40
7-10	260	0.93 ± 0.13	0.96 ± 0.10	.61
Males				
11-14	135	0.93 ± 0.13	0.91 ± 0.14	.72
15-18	157	0.93 ± 0.14	0.86 ± 0.18	.71
19-22	115	0.84 ± 0.20	0.71 ± 0.21	.72
23-50	566	0.88 ± 0.16	0.77 ± 0.19	.65
51-69	269	0.89 ± 0.17	0.86 ± 0.19	.70
70+	117	0.90 ± 0.16	0.89 ± 0.16	.74
Females				
11-14	137	0.94 ± 0.12	0.95 ± 0.11	.73
15-18	138	0.85 ± 0.21	0.85 ± 0.20	.84
19-22	118	0.80 ± 0.24	0.79 ± 0.22	.81
23-50	751	0.83 ± 0.22	0.84 ± 0.21	.82
51-69	405	0.86 ± 0.19	0.90 ± 0.17	.79
70+	203	0.89 ± 0.15	0.93 ± 0.13	.70

TABLE 11

Mean Riboflavin NAR for each Sex-Age Category as Determined by Standard and Food Frequency Methods, and Correlation Coefficients for the Relationship Between the NARs Determined by These Two Methods

Sex and Age (years)	n	Method of Determining Riboflavin NAR: Standard	Food Frequency	Correlation Coefficient
		mean riboflavin NAR ± standard deviation		
Males and females				
1-3	151	0.99 ± 0.06	1.00 ± 0.00	.67
4-6	179	0.98 ± 0.07	1.00 ± 0.02	.51
7-10	260	0.97 ± 0.08	0.97 ± 0.08	.54
Males				
11-14	135	0.97 ± 0.09	0.95 ± 0.12	.74
15-18	157	0.95 ± 0.12	0.88 ± 0.18	.75
19-22	115	0.88 ± 0.19	0.78 ± 0.22	.78
23-50	566	0.93 ± 0.14	0.81 ± 0.20	.67
51-69	269	0.92 ± 0.16	0.87 ± 0.19	.75
70+	117	0.92 ± 0.16	0.91 ± 0.16	.86
Females				
11-14	137	0.96 ± 0.10	0.96 ± 0.11	.87
15-18	138	0.91 ± 0.17	0.89 ± 0.17	.82
19-22	118	0.84 ± 0.22	0.81 ± 0.22	.87
23-50	751	0.85 ± 0.20	0.85 ± 0.20	.82
51-69	405	0.88 ± 0.18	0.90 ± 0.18	.82
70+	203	0.92 ± 0.14	0.93 ± 0.13	.76

TABLE 12

Mean Vitamin B6 NAR for each Sex-Age Category as Determined by Standard and Food Frequency Methods, and Correlation Coefficients for the Relationship Between the NARs Determined by These Two Methods

Sex and Age (years)	n	Method of Determining Vitamin B6 NAR: Standard	Food Frequency	Correlation Coefficient
		mean vitamin B6 NAR ± standard deviation		
Males and females				
1-3	151	0.88 ± 0.14	0.91 ± 0.10	.71
4-6	179	0.91 ± 0.11	0.93 ± 0.10	.70
7-10	260	0.90 ± 0.13	0.92 ± 0.10	.74
Males				
11-14	135	0.89 ± 0.13	0.91 ± 0.10	.64
15-18	157	0.86 ± 0.13	0.88 ± 0.10	.61
19-22	115	0.83 ± 0.13	0.86 ± 0.10	.65
23-50	566	0.86 ± 0.13	0.87 ± 0.10	.67
51-69	269	0.87 ± 0.13	0.89 ± 0.11	.70
70+	117	0.89 ± 0.14	0.90 ± 0.12	.77
Females				
11-14	137	0.86 ± 0.14	0.89 ± 0.11	.67
15-18	138	0.86 ± 0.14	0.88 ± 0.11	.67
19-22	118	0.85 ± 0.14	0.87 ± 0.11	.67
23-50	751	0.86 ± 0.14	0.87 ± 0.11	.65
51-69	405	0.90 ± 0.12	0.92 ± 0.10	.64
70+	203	0.91 ± 0.12	0.92 ± 0.11	.68

TABLE 13

Mean Vitamin B12 NAR for each Sex-Age Category as Determined by Standard and Food Frequency Methods, and Correlation Coefficients for the Relationship Between the NARs Determined by These Two Methods

Sex and Age (years)	n	Method of Determining Vitamin B12 NAR: Standard	Food Frequency	Correlation Coefficient
		mean vitamin B12 NAR ± standard deviation		
Males and females				
1-3	151	0.95 ± 0.13	0.99 ± 0.06	.65
4-6	179	0.95 ± 0.13	0.99 ± 0.03	.43
7-10	260	0.95 ± 0.12	0.98 ± 0.09	.65
Males				
11-14	135	0.97 ± 0.10	0.98 ± 0.09	.73
15-18	157	0.97 ± 0.10	0.96 ± 0.11	.74
19-22	115	0.94 ± 0.15	0.92 ± 0.15	.63
23-50	566	0.96 ± 0.11	0.92 ± 0.15	.60
51-69	269	0.92 ± 0.18	0.90 ± 0.18	.77
70+	117	0.90 ± 0.18	0.91 ± 0.16	.71
Females				
11-14	137	0.94 ± 0.13	0.96 ± 0.12	.75
15-18	138	0.89 ± 0.19	0.91 ± 0.18	.66
19-22	118	0.81 ± 0.25	0.84 ± 0.23	.86
23-50	751	0.82 ± 0.23	0.86 ± 0.21	.76
51-69	405	0.82 ± 0.23	0.88 ± 0.20	.73
70+	203	0.81 ± 0.23	0.86 ± 0.20	.74

TABLE 14

Mean Vitamin C NAR for each Sex-Age Category as Determined by Standard and Food Frequency Methods, and Correlation Coefficients for the Relationship Between the NARs Determined by These Two Methods

Sex and Age (years)	n	Method of Determining Vitamin C NAR: Standard	Food Frequency	Correlation Coefficient
		mean vitamin C NAR ± standard deviation		
Males and females				
1-3	151	0.84 ± 0.25	0.91 ± 0.17	.76
4-6	179	0.86 ± 0.23	0.93 ± 0.16	.75
7-10	260	0.94 ± 0.16	0.95 ± 0.12	.63
Males				
11-14	135	0.93 ± 0.14	0.88 ± 0.18	.62
15-18	157	0.88 ± 0.21	0.85 ± 0.21	.67
19-22	115	0.82 ± 0.28	0.75 ± 0.28	.70
23-50	566	0.83 ± 0.24	0.76 ± 0.26	.69
51-69	269	0.84 ± 0.25	0.78 ± 0.27	.73
70+	117	0.81 ± 0.28	0.78 ± 0.29	.81
Females				
11-14	137	0.89 ± 0.21	0.90 ± 0.18	.68
15-18	138	0.75 ± 0.29	0.76 ± 0.25	.78
19-22	118	0.77 ± 0.28	0.72 ± 0.26	.66
23-50	751	0.74 ± 0.30	0.74 ± 0.27	.78
51-69	405	0.85 ± 0.25	0.83 ± 0.25	.80
70+	203	0.85 ± 0.24	0.83 ± 0.25	.80

(continued from page 20)

The mean NAR for magnesium is overestimated by the frequency method for children one to six, and underestimated for males 11 and older. There is little difference between mean magnesium NARs in all female age categories. Correlations are weakest (.50 to.62) between NARs for children ten years or less, and range from .68 to .83 among older age groups.

Phosphorus NARs determined by both methods exhibit a high degree of similarity, with the mean values for only two groups--children one to three and males 15 to 18--differing by greater than .04. Correlations are .51 or less for children ages four to ten and for 23 to 50 year old males. For all other groups, correlations range from .63 to .82, and are generally stronger between NARs for female age groups.

Mean vitamin A NARs are underestimated by the food frequency method for all sex-age groups 11 years and older, though the range of differences between NARs in the male groups is .05 to .15 while that for females is .02 to .08. Correlation coefficients fall between .70 and .77 except for children aged one to three (.42) and seven to ten (.64).

Differences between mean thiamin NARs are generally small, exceeding .04 only for children four to six years and males 15 to 50. For the males, these differences between mean NARs are again underestimated by the frequency method. Correlations are weakest for children through age ten, ranging from .32 to .61. The range of correlations among adolescents and adults is .65 to .74 for males and .70 to .84 for females.

Mean NARs for riboflavin as determined by the frequency method, are underestimated for males 15 to 69 years. The differences between mean NARs for this group range from .05 to .12. Differences between mean NARs

for all other sex-age groups are .03 or less. Correlation coefficients range from .51 to .67 for children through age 10 and for males 23 to 50, and from .74 to .87 for all other groups.

Using a protein-based determination of vitamin B6 values, differences between NARs for all sex-age groups are uniformly small, never exceeding .03. Correlations range from .61 to .77.

Only for females over age 50 do the differences between mean vitamin B12 NARs exceed .04. For this group of women, the food frequency overestimates the NAR by about .05. The correlation between mean NARs for children 4-6 is .43, and for females 19-22 is .86; all other correlations fall between .60 and .77.

For vitamin C, the frequency method tends to overestimate mean NARs for children aged six or less, and underestimates mean NARs for males 11 to 14 and 19 to 69 and for females 19 to 22. The differences between mean NARs for these groups range from .05 to .07, and are .03 or less for all others. Correlations between NARs determined by the two methods range from .62 to .81 for all sex-age groups.

Table 15 compares mean MAR11 values determined by standard and food frequency methods. This latter method tends to slightly overestimate nutrient adequacy for children through age six, while underestimating adequacy for males 15 to 69. For the remaining sex-age groups, differences are small between MAR11 values determined by the standard and frequency methods, not exceeding 3.0. Correlation coefficients are uniformly high, ranging from .75 to .86 for all but seven to ten year old children (.69).

Mean calorie intakes, and the percent of calories from protein, fat, and carbohydrate were also determined by both the standard and food

TABLE 15

Mean MAR11 for each Sex-Age Category as Determined by Standard and Food Frequency Methods, and Correlation Coefficients for the Relationship Between the MAR11s Determined by These Two Methods

Sex and Age (years)	n	Method of Determining MAR11		Correlation Coefficient
		Standard	Food Frequency	
		mean MAR11 ± standard deviation		
Males and females				
1-3	151	88.6 ± 9.2	94.6 ± 5.0	.77
4-6	179	91.7 ± 9.0	96.5 ± 5.1	.75
7-10	260	93.3 ± 8.2	95.0 ± 7.4	.69
Males				
11-14	135	88.8 ± 10.9	85.8 ± 11.6	.84
15-18	157	88.0 ± 11.6	80.9 ± 13.3	.81
19-22	115	86.5 ± 13.1	79.3 ± 14.4	.80
23-50	566	89.2 ± 9.4	81.5 ± 12.8	.76
51-69	269	87.9 ± 12.2	83.8 ± 14.5	.80
70+	117	87.4 ± 12.2	86.1 ± 13.5	.85
Females				
11-14	137	85.5 ± 11.3	85.7 ± 11.2	.84
15-18	138	78.9 ± 15.5	77.7 ± 14.9	.86
19-22	118	78.0 ± 15.1	75.8 ± 15.3	.85
23-50	751	78.2 ± 15.5	77.8 ± 15.2	.85
51-69	405	84.9 ± 13.2	86.1 ± 13.6	.83
70+	203	85.6 ± 11.6	87.2 ± 11.8	.79

frequency methods and are shown in Table 16. For children aged one to three and four to six, the frequency method overestimates mean calorie intakes by approximately 37 percent and 21 percent, respectively. Intakes are underestimated by this method for all male and for most female age categories, though the magnitude of this shortfall exceeds ten percent only among the males. Correlations between intakes determined by both methods range from .62 to .80.

For all sex-age groups, the frequency method tends to overestimate slightly the mean percent of calories from protein. However, in no instance is the difference between means greater than 1.0 percent of calories. Correlations are generally strong, with a range of from .66 to .82.

The frequency method also tends to overestimate slightly the mean percent of calories from fat for most groups. The exceptions to this are males 23 and older and females 51 and older. Only for the oldest male group is this underestimation greater than one percent of calories. Correlations between the mean values generated by the standard and frequency methods range from .59 (for males 19 to 22) to .78 (for females 19 to 22).

Differences between mean values for percent of calories from carbohydrate are generally small, being slightly underestimated overall by the food frequency method. Males 23 and older, and females 51-69, are exceptions to this trend, albeit minor ones.

Categorization of Individuals. Another common way of reporting the dietary intake of a group of individuals is to determine the percent of persons above and below a certain level of intake for each nutrient. Therefore, we decided to compare the food frequency and the standard

TABLE 16

Mean Daily Caloric Intake and Mean Percent of Calories from Protein, Fat and Carbohydrate for each Sex-Age Category as Determined By Standard and Food Frequency Methods, with Correlation Coefficients

Sex and Age (years)	n	Calories		Protein		Fat		Carbohydrate	
		Standard	Food Frequency	Standard	Food Frequency	Standard	Food Frequency	Standard	Food Frequency
		← mean calories ± standard deviation →		← mean percent of calories ± standard deviation →					
Males and Females									
1-3	151	1270 ± 374	1737 ± 423 (.69)*	16.5 ± 3.2	17.1 ± 2.6 (.82)	37.1 ± 7.5	38.6 ± 5.2 (.71)	47.6 ± 9.0	45.1 ± 6.9 (.72)
4-6	179	1515 ± 381	1828 ± 364 (.67)	15.7 ± 2.9	16.4 ± 2.3 (.79)	37.5 ± 5.8	38.9 ± 4.6 (.71)	47.8 ± 7.5	45.4 ± 6.2 (.77)
7-10	260	1868 ± 490	1939 ± 421 (.62)	15.7 ± 2.7	16.6 ± 2.3 (.79)	38.7 ± 5.3	40.4 ± 4.2 (.70)	46.6 ± 6.9	43.7 ± 5.7 (.77)
Males									
11-14	135	2277 ± 673	1963 ± 504 (.76)	15.9 ± 2.9	16.6 ± 2.1 (.69)	39.3 ± 5.4	40.7 ± 4.0 (.60)	45.9 ± 6.6	43.5 ± 5.5 (.67)
15-18	157	2568 ± 819	1932 ± 516 (.76)	15.9 ± 2.7	16.6 ± 2.2 (.73)	40.0 ± 6.1	41.5 ± 4.0 (.60)	44.2 ± 7.4	42.1 ± 5.5 (.69)
19-22	115	2296 ± 715	1719 ± 473 (.68)	16.6 ± 2.8	17.4 ± 2.5 (.72)	40.3 ± 6.3	41.9 ± 4.8 (.59)	42.8 ± 7.6	40.3 ± 6.1 (.62)
23-50	566	2380 ± 707	1786 ± 480 (.64)	16.6 ± 3.2	16.8 ± 2.7 (.77)	42.3 ± 6.9	42.3 ± 5.4 (.71)	39.2 ± 8.5	39.2 ± 7.1 (.77)
51-69	269	2062 ± 730	1712 ± 520 (.71)	17.0 ± 3.6	17.1 ± 3.1 (.81)	42.0 ± 8.1	41.4 ± 6.4 (.74)	39.6 ± 10.0	40.2 ± 8.2 (.78)
70+	117	1890 ± 651	1713 ± 463 (.62)	16.6 ± 4.1	16.8 ± 2.3 (.66)	41.3 ± 6.8	39.8 ± 5.0 (.62)	42.0 ± 8.8	43.2 ± 6.2 (.65)
Females									
11-14	137	1936 ± 534	1850 ± 415 (.69)	15.3 ± 2.6	16.3 ± 2.1 (.78)	39.2 ± 5.4	40.7 ± 3.9 (.62)	46.4 ± 7.0	43.6 ± 5.4 (.70)
15-18	138	1756 ± 568	1644 ± 495 (.80)	16.1 ± 3.1	16.8 ± 2.7 (.76)	39.8 ± 6.4	41.3 ± 4.7 (.71)	44.7 ± 8.3	42.3 ± 6.4 (.72)
19-22	118	1573 ± 514	1450 ± 452 (.79)	16.4 ± 3.3	17.0 ± 2.6 (.76)	40.2 ± 7.9	40.9 ± 6.2 (.78)	43.1 ± 9.4	41.9 ± 7.7 (.77)
23-50	751	1526 ± 553	1482 ± 462 (.78)	17.0 ± 3.8	17.1 ± 3.0 (.75)	41.5 ± 7.5	41.7 ± 6.0 (.71)	40.9 ± 9.2	40.7 ± 7.7 (.76)
51-69	405	1487 ± 478	1528 ± 436 (.72)	17.1 ± 3.6	17.2 ± 2.9 (.76)	40.6 ± 7.5	40.3 ± 5.4 (.67)	42.3 ± 9.2	42.6 ± 7.2 (.73)
70+	203	1410 ± 409	1488 ± 397 (.70)	16.6 ± 3.6	17.0 ± 3.1 (.79)	38.6 ± 7.1	38.5 ± 5.9 (.73)	45.7 ± 9.1	45.3 ± 7.8 (.78)

*Numbers in parentheses indicate correlation coefficients between values determined by Standard and Food Frequency methods.

methods with regard to the ways in which they categorized the population according to each of the NARs, the MAR11, and the percent of calories from fat.

Appendix F shows, for each nutrient, the percent of persons in each sex-age group with NARs less than .60, .60 to .79, and .80 to 1.00, as determined by both the standard and food frequency methods. In the following discussion, we will use the symbols "<.60" to refer to NARs which are less than .60 and "≥.80" to refer to those between .80 and 1.00. The percentage point difference between the two methods in the number of persons determined to have NARs of <.60 and ≥.80 is shown in Tables 17 and 18, respectively, for all eleven nutrients. This information is further simplified in Figures 1 and 2, wherein percentage point differences of five or greater are highlighted.

Both methods determined that greater than 90 percent of the persons in all sex-age categories had protein NARs of ≥.80. For all sex-age groups, the food frequency method and the standard method designated virtually the same number of individuals in each category.

In estimating calcium intakes, the food frequency method ascribes an NAR of ≥.80 to more elderly women and one to six year old children than does the standard method. Accordingly, it underestimates, relative to the standard method, the number of these women and children with NARs <.60. For males 11 to 69 years of age, this situation is reversed: the food frequency method classifies fewer individuals as having NARs ≥.80. Elderly males are more apt, and young adult females are less apt, to be classified as having NARs of ≥.80 by the food frequency than by the standard method.

(Text continued on page 42)

TABLE 17

Percentage Point Change in Number of Persons in Each Sex-Age Category with NARs Below .60, if Determined by Food Frequency Instead of Standard Method

Sex and Age (years)	n	NAR										
		Pro	Ca	Fe	Mg	Phos	Vit A	Thia	Ribo	Vit B6	Vit B12	Vit C
		← % Point Change* →										
Males and Females												
1-3	151	0.0	-14.6	-49.7	-6.6	-5.9	-3.3	-2.0	-0.7	-2.6	-3.3	-15.2
4-6	179	0.0	-10.7	-5.0	-8.4	-2.2	-5.6	-0.6	-0.6	-0.6	-2.8	-11.8
7-10	260	0.0	0.0	-0.8	-4.6	-0.4	-3.0	-2.3	+1.1	-1.5	-1.6	-3.8
Males												
11-14	135	+1.5	+2.3	+0.7	+8.9	0.0	+14.1	+1.5	+1.5	-3.0	-0.7	+5.2
15-18	157	+0.7	+18.5	+15.9	+28.6	+4.4	+16.5	+5.8	+7.7	-3.2	-1.3	+0.6
19-22	115	+0.9	+17.4	+6.1	+30.4	+0.9	+24.3	+16.5	+13.0	-3.5	+0.9	+8.7
23-50	566	+0.5	+18.4	+0.8	+30.4	+1.7	+23.7	+11.5	+11.7	-2.2	+3.4	+9.6
51-69	269	+1.1	+10.1	+1.1	+17.5	+0.4	+6.7	+2.6	+6.0	-3.7	+0.7	+6.7
70+	117	-0.9	-1.7	0.0	+7.7	+1.8	+6.0	-0.9	-2.6	-4.3	-1.7	+6.0
Females												
11-14	137	0.0	0.0	-7.3	0.0	-1.5	+0.8	-2.2	+1.5	-2.2	-1.5	-3.6
15-18	138	-2.2	+5.1	+1.4	+2.2	+1.4	+5.8	-3.6	0.0	-5.1	+1.5	0.0
19-22	118	-0.8	+4.2	+7.7	+6.8	-2.5	+11.1	-5.1	+4.2	-0.9	-0.8	0.0
23-50	751	-0.1	+1.7	-1.7	+2.3	-1.5	+7.7	-5.0	+0.1	-2.8	-4.9	-0.6
51-69	405	-0.3	-3.9	-1.2	+1.7	-0.5	+3.7	-3.7	-2.0	-1.3	-8.8	+2.9
70+	203	0.0	-8.9	-2.5	-7.4	0.0	+1.0	-3.0	-1.0	-1.5	-7.4	+2.5

*Positive values indicate that estimate derived by food frequency method was higher than that derived by standard method while negative values indicate that estimate derived by food frequency method was lower.

FIGURE 1

Change in Number of Persons in Each Sex-Age Category with NARs Below .60, if Determined by Food Frequency Instead of Standard Method

Sex and Age (years)	n	NAR										
		Pro	Ca	Fe	Mg	Phos	Vit A	Thia	Ribo	Vit B6	Vit B12	Vit C
		← Change* →										
Males and Females												
1-3	151		--	--	-	-						--
4-6	179		--	-	-		-					--
7-10	260											
Males												
11-14	135				+		++					+
15-18	157		++	++	++		++	+	+			
19-22	115		++	+	++		++	++	++			+
23-50	566		++		++		++	++	++			+
51-69	269		++		++		+		+			+
70+	117				+		+					+
Females												
11-14	137			-								
15-18	138		+				+			-		
19-22	118			+	+		++	-				
23-50	751						+	-				
51-69	405										-	
70+	203		-		-					-		

*Key: +Estimate derived by food frequency method was 5.0 to 9.9 percentage points higher than that derived by standard method

++Estimate derived by food frequency method was 10.0 or more percentage points higher than that derived by standard method

-Estimate derived by food frequency method was 5.0 to 9.9 percentage points lower than that derived by standard method

--Estimate derived by food frequency method was 10.0 or more percentage points lower than that derived by standard method

TABLE 18

Percentage Point Change in Number of Persons in Each Sex-Age Category with NARs at or Above .80, if Determined by Food Frequency Instead of Standard Method

Sex and Age (years)	n	NAR										
		Pro	Ca	Fe	Mg	Phos	Vit A	Thia	Ribo	Vit B6	Vit B12	Vit C
		← % Point Change* →										
Males and Females												
1-3	151	+1.3	+7.9	+24.5	+15.9	+15.9	+6.6	+4.6	+3.3	+13.3	+8.7	+10.0
4-6	179	0.0	+11.7	+28.5	+22.8	+9.5	+8.4	+10.6	+2.2	+7.9	+9.0	+9.5
7-10	260	-0.4	+3.1	+5.8	+10.0	+1.6	+3.1	+4.2	+2.4	+10.0	+5.4	0.0
Males												
11-14	135	+1.5	-10.3	-21.5	-14.8	-5.2	-20.7	-2.3	-5.1	+10.4	+3.0	-14.1
15-18	157	-3.2	-17.2	-43.3	-29.3	-12.7	-25.5	-15.3	-16.0	+7.0	-3.2	-9.0
19-22	115	-4.3	-20.9	-10.4	-28.7	-2.6	-23.5	-23.5	-23.4	+10.5	-2.6	-11.4
23-50	566	-3.7	-19.1	-8.0	-33.2	-5.0	-24.7	-26.3	-27.2	+7.6	-11.5	-14.5
51-69	269	-4.1	-10.4	-7.0	-23.1	-4.1	-14.1	-7.8	-12.3	+3.3	-1.2	-11.9
70+	117	0.0	+7.7	-4.3	-10.2	-1.7	-14.5	-3.4	-3.4	+1.7	+3.4	-4.3
Females												
11-14	137	0.0	-2.9	-1.5	-5.1	+4.4	-4.3	+3.7	-1.5	+10.2	+0.7	+4.4
15-18	138	-0.8	-8.0	-7.3	-10.9	-1.5	-14.5	0.0	-5.8	+9.4	+5.1	-3.7
19-22	118	-1.7	-7.6	-8.5	-10.2	-5.9	-13.6	-4.3	-5.9	+11.0	+8.4	-11.0
23-50	751	+2.7	-2.8	-7.3	-8.4	+1.3	-9.6	+1.4	-3.6	+6.4	+5.6	-3.9
51-69	405	-0.2	+1.7	+4.5	+2.5	+4.2	-9.1	+7.2	+3.2	+6.1	+10.1	-4.9
70+	203	+1.0	+8.4	+6.9	-2.5	+5.4	-5.4	+8.4	0.0	+2.4	+7.4	-4.9

*Positive values indicate that estimate derived by food frequency method was higher than that derived by standard method while negative values indicate that estimate derived by food frequency method was lower.

FIGURE 2

Change in Number of Persons in Each Sex-Age Category with NARs at or Above .80, if Determined by Food Frequency Instead of Standard Method

Sex and Age (years)	n	NAR										
		Pro	Ca	Fe	Mg	Phos	Vit A	Thia	Ribo	Vit B6	Vit B12	Vit C
		← Change* →										
Males and Females												
1-3	151		+	++	++	++	+			++	+	++
4-6	179		++	++	++	+	+	++		+	+	+
7-10	260			+	++					++	+	
Males												
11-14	135		--	--	--	-	--		-	++		--
15-18	157		--	--	--	--	--	--	--	+		-
19-22	115		--	--	--		--	--	--	++		--
23-50	566		--	-	--	-	--	--	--	+	--	--
51-69	269		--	-	--		--	-	--			--
70+	117		+		--		--					
Females												
11-14	137				-					++		
15-18	138		-	-	--		--		-	+	+	
19-22	118		-	-	--	-	--		-	++	+	--
23-50	751			-	-		-			+	+	
51-69	405						-	+		+	++	
70+	203		+	+		+	-	+			+	

*Key: +Estimate derived by food frequency method was 5.0 to 9.9 percentage points higher than that derived by standard method

++Estimate derived by food frequency method was 10.0 or more percentage points higher than that derived by standard method

-Estimate derived by food frequency method was 5.0 to 9.9 percentage points lower than that derived by standard method

--Estimate derived by food frequency method was 10.0 or more percentage points lower than that derived by standard method

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For iron, the food frequency underestimates the number of one to three year olds with NARs <.60 by about 50 percentage points, compared to the standard method. It also underestimates the number of four to six year olds and 11 to 14 year old females with iron NARs <.60, but only by about five and seven percentage points, respectively. Among 15 to 22 year old males and 19 to 22 year old females, the food frequency method suggests more persons have iron NARs <.60 than does the standard method.

In determining the number of individuals with iron NARs ≥.80, there are sizeable differences between the two methods for many sex-age groups. Specifically, the food frequency overestimates the number of children, especially one to six year olds; underestimates the number of males over 11, especially the teenagers; underestimates the number of females 15 to 50 and overestimates the number of elderly women.

For many sex-age groups, there were differences between the two methods of 10 to 30 percentage points, in the categorization of individuals as having magnesium NARs <.60 and ≥.80. For children, the percent with NARs ≥.80 was largely overestimated by the food frequency method whereas, for males over ten years and for 15 to 22 year old females, it was underestimated by this method. In determining the number of 15 to 69 year old males with NARs <.60, the food frequency overestimated the standard method by about 18 to 30 percentage points.

Somewhat smaller differences between the two methods can also be noted for other sex-age groups in the categorization of individuals according to magnesium NARs. One to six year olds and elderly females are underestimated in the <.60 category, while males 11 to 14 years or 70 years and over and 19 to 22 year old females are overestimated in this category.

In general, individuals are classified by the two methods more similarly according to their phosphorus NARs than by many other NARs. This is especially true for the <.60 category, for which only one to three year olds show any remarkable difference between the two methods. In the ≥.80 category, most differences between the two methods do not exceed ten percentage points. Exceptions to this are one to three year olds, whose numbers are overestimated, and 15 to 18 year old males, whose numbers are underestimated.

The largest differences between the two methods in categorizing individuals according to Vitamin A NARs can be seen for males 11 and over. For this group, the food frequency method underestimates the number of individuals with NARs ≥.80 by about 14 to 25 percentage points, while it overestimates the number at <.60 by six to 24 points. For many other sex-age groups, the food frequency method closely approximates the standard method in determining the number of persons with Vitamin A NARs <.60. However, in counting the number of persons with NARs ≥.80, the food frequency method underestimates the number of one to six year olds by seven to nine points and overestimates females over 14 by about five to 15 points.

The food frequency method gives a reasonable approximation of the number of individuals determined by the standard method to have thiamin NARs <.60, for most sex-age groups. However, it overestimates this number for 15 to 50 year old males and underestimates it for 19 to 50 year old females. In figuring the number of persons with thiamin NARs ≥.80, the food frequency underestimates the standard method for adolescent and adult males, especially those between 15 and 50 years of age. For four to six year old children and women over 50 years, the food

frequency method suggests more persons have NARs $\geq$.80 than does the standard method.

For riboflavin NARs, among most sex-age groups, the food frequency method assigns virtually the same proportion of individuals as does the standard method into the <.60 category. Males 15 to 69 years of age were an exception: their proportion in this category was overestimated by 6 to 13 percentage points. The food frequency also approximated the standard method in determining the number of individuals with riboflavin NARs $\geq$.80 for many sex-age groups. However, it underestimated the percentage of 11 to 69 year old males and 15 to 22 year old females in this category by five to 27 points.

The two methods categorized individuals more similarly according to B6 and B12 NARs than according to any other vitamins we examined. In the <.60 categories, the food frequency method only underestimated, for Vitamin B6, the number of 15 to 18 year old females by about five percentage points and, for Vitamin B12, the number of females over 50 by about seven to nine points.

In the $\geq$.80 category for Vitamin B6, the food frequency method consistently overestimated the standard method but the differences between the two methods did not exceed 11 percentage points. In this higher category for Vitamin B12, the percentages of children and older females were overestimated by about five to ten points while among males 23 to 50 years of age the percentage was underestimated by about 12 points.

For Vitamin C, the food frequency tended to overestimate the number of children one to six years in the $\geq$.80 category and to underestimate their numbers in the <.60 category. This situation was reversed for

adolescent and adult males, with the food frequency overestimating the percent in the lower category and underestimating the percent in the higher. Adolescent and adult females were assigned to both categories approximately by the food frequency method, except that 19 to 22 year olds were underrepresented in the $\geq$.80 category.

Categorization of individuals according to MAR11 scores, by both methods, is shown in Appendix F-12. Table 19 shows the percentage point change in the number of persons in each sex-age category with MAR11s <.60 and $\geq$.80, if determined by the food frequency instead of the standard method. If <.60 is used as the cut-off point for categorizing individuals according to their overall nutrient adequacy, the food frequency method gives a reasonable approximation of the results that would be obtained by the standard method. Only for males aged 15 to 50 is there a sizeable difference between the two methods in the number of individuals considered to have MAR11s <.60: the food frequency overestimates the number of these individuals by five to ten points.

When $\geq$.80 is used as the cut-off point for categorizing individuals according to overall adequacy, there are large differences in many sex-age groups in the way individuals are categorized. In general, the number of children with MAR11 scores $\geq$.80 is overestimated and the number of men is underestimated, by the frequency method. Females 19 to 22 years old are underestimated in this category by the food frequency method, whereas adolescent and older adult females are categorized equivalently by both methods.

Table 20 displays the percent of persons in each sex-age category with less than 57 percent of their calories from fat, as determined by both methods. Table 21 shows the percentage point change in the number

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TABLE 19

Percentage Point Change in Number of Persons in Each Sex-Age Category with MAR11s <.60 and ≥.80, if Determined by Food Frequency Instead of Standard Method

Sex and Age (years)	n	MAR11 <.60	MAR11 ≥.80
		←% Point Change*→	
Males and Females			
1-3	151	-2.0	+14.6
4-6	179	-1.7	+6.2
7-10	260	0.0	+5.0
Males			
11-14	135	+2.2	-9.7
15-18	157	+6.3	-23.6
19-22	115	+9.5	-20.9
23-50	566	+5.6	-24.7
51-69	269	+4.5	-9.3
70+	117	+0.9	-4.2
Females			
11-14	137	0.0	0.0
15-18	138	0.0	-4.4
19-22	118	+3.4	-10.1
23-50	751	+0.8	-0.7
51-69	405	-0.7	+5.1
70+	203	+0.9	+5.4

*Positive values indicate that estimate derived by food frequency method was higher than that derived by standard method while negative values indicate that estimate derived by food frequency method was lower.

TABLE 20

Percent of Persons in each Sex-Age Category with Less than 35 Percent of Their Calories from Fat, as Determined by Standard and by Food Frequency Methods

Sex and Age (years)	n	Method of Determining Fat and Calorie Intakes	
		Standard	Food Frequency
		← % →	
Males and females			
1-3	151	39.7	21.8
4-6	179	30.2	17.3
7-10	260	24.2	10.4
Males			
11-14	135	17.8	8.9
15-18	157	20.4	6.4
19-22	115	19.1	9.6
23-50	566	14.1	8.5
51-69	269	16.7	12.3
70+	117	14.5	18.0
Females			
11-14	137	17.5	7.3
15-18	138	24.6	6.5
19-22	118	22.9	14.4
23-50	751	17.6	12.6
51-69	405	22.7	15.1
70+	203	30.5	26.6

TABLE 21

Percentage Point Change in Number of Persons in Each Sex-Age Category With Less Than 35 Percent of Their Calories From Fat, if Determined by Food Frequency Instead of Standard Method

Sex and Age (years)	n	% Point Change*
Males and Females		
1-3	151	-17.9
4-6	179	-12.9
7-10	260	-13.8
Males		
11-14	135	-8.9
15-18	157	-14.0
19-22	115	-9.5
23-50	566	-5.6
51-69	269	-4.4
70+	117	+3.5
Females		
11-14	137	-10.2
15-18	138	-18.1
19-22	118	-8.5
23-50	751	-5.0
51-69	405	-7.6
70+	203	-3.9

*Positive values indicate that estimate derived by food frequency method was higher than that derived by standard method while negative values indicate that estimate derived by food frequency method was lower.

(continued from page 45)

of persons with less than 35 percent of their calories from fat, if determined by the food frequency rather than the standard method. In general, the food frequency method underestimates the number of persons with proportionately low fat intakes. This is especially true for persons one to ten and 15 to 18 years of age. Only for males aged 70 and older does the food frequency method overestimate the number having less than 35 percent of their calories from fat, but the increase is small: only 3.5 percentage points.

Identification of Problem Nutrients. Pao and Mickle (13) have introduced another useful measure of dietary quality for groups of individuals: the concept of problem nutrients. They defined problem nutrients as those for which mean intakes for a particular sex-age group were below 70 percent of the RDA.

We compared problem nutrients for each sex-age group that were identified by the food frequency with those that were identified by the standard method. For our purposes we defined a problem nutrient as one for which mean NARs (which are truncated at 1.00) are less than .70. Since Pao and Mickle looked at different sex-age groups and used untruncated RDA means, our results cannot be compared to theirs.

Figure 3 compares the problem nutrients we identified by the standard method with those determined by the food frequency method. In general, the food frequency identifies the same nutrients as problems as does the standard method for most female adolescent and adult groups. On the other hand, for male adolescent and adult groups, the food frequency suggests problem nutrients that are not apparent by the standard method. For children, the food frequency fails to recognize the one major problem nutrient of one to three year olds--iron--that was identified by the standard method.

FIGURE 3

Problem Nutrients*, as Identified by Standard and by Food Frequency Methods

Sex and Age (years)	Pro	Ca	Fe	Mg	Phos	Vit A	Thia	Ribo	Vit B6 RDA#	Vit B6 Alt. Std.+	Vit B12	Vit C
Males and Females			■									
1-3												
4-6												
7-10												
Males												
11-14		●	●	●		●						
15-18				●		●						
19-22				●		●			●			
23-50				●					●			
51-60									●			
70+									■●			
Females			■●									
11-14		■●	■●	■●		●						
15-18		●	■●	■●		●			■●			
19-22		■●	■●	■●					■●			
23-50		■●							■●			
51-69		■							■●			
70+									■●			

*A "problem" nutrient is one for which mean NARs are <.70.
#RDA used to assess Vitamin B6.
+Protein based standard used to assess Vitamin B6.

■ "Problem" nutrient according to standard method
● "Problem" nutrient according to food frequency method

DISCUSSION

In order to compare the food frequency and standard methods we looked at mean values for NARs of 11 nutrients, an MAR11, caloric intake and percent of calories from protein, fat and carbohydrate. Along with the means of each of those dietary quality measures, we examined correlation coefficients for the relationships between each measure derived from the food frequency and its corresponding measure derived by the standard method. We also examined what percent of persons would be categorized as having NARs and MARs <.60 and ≥.80 by the two methods. Finally, we used the two methods to identify problem nutrients. We felt it was important to look at our results in each of these ways, since each gave a slightly different picture of how well the in food frequency compared to the standard method in quantifying dietary quality

For some nutrients there is little or no difference between means determined by the two methods. This is particularly notable for protein, where mean NARs are high for all sex-age groups, but is also the case for phosphorus and vitamin B6. When there are differences in means, they usually occur for children 1-6 years of age and males 11-69. The frequency method tends to overestimate mean NARs for children and underestimate them for males. This pattern is also reflected in the means for MAR11 and caloric intake.

The methods were similar in categorizing protein, phosphorus and vitamin B6 NARs as either "<.60" or "≥.80". The two methods differed to varying degrees in their categorization of other nutrients but, in general, the frequency method underestimates the number of children with NARs <.60 and overestimates the number with NARs ≥.80. Conversely the

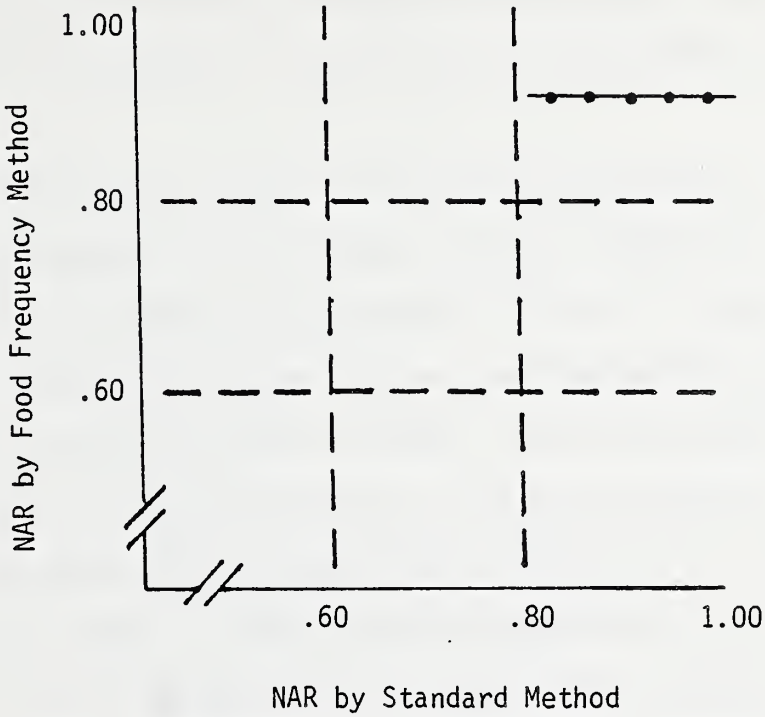
food frequency method tends to overestimate the number of adolescent and adult males with values <.60 and underestimate those above ≥.80.

Correlation coefficients, which show the strength of the linear relationship between the two methods for each of the dietary quality measures, provide a different perspective on the comparability of these two methods. Nutrients with higher correlation coefficients--calcium, riboflavin, magnesium, thiamin, and vitamin C--were not the nutrients with the closest means or the nutrients for which individuals were categorized most similarly. Figure 4 displays two hypothetical relationships which show how such apparent discrepancies can arise. Part A of Figure 3 shows a sitution similar to the one we have seen for protein NARs for children. That is, both methods categorize all individuals as having NARs ≥.80, yet the correlation coefficient is zero. This is because one of the methods--in this case, the food frequency--attributed exactly the same NAR to all persons. In our study, since NARs were truncated at 1.00, this finding for protein was not unexpected. This lack of variance in an NAR determined by the food frequency causes the correlation to be zero, since information about the estimated NAR (from the food frequency) could not be used to predict the actual NAR (from the standard method).

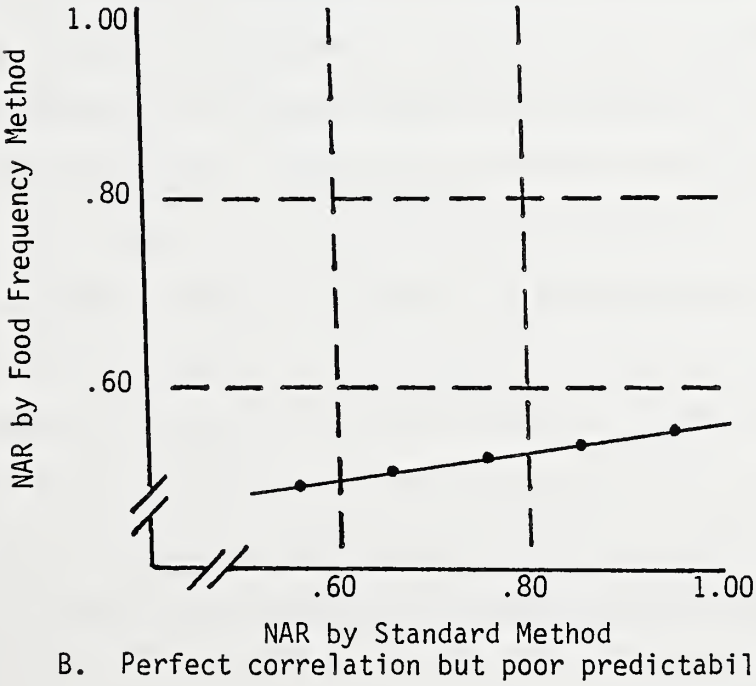
On the other hand, as shown in Part B of Figure 3, a perfect correlation does not necessarily mean that all individuals will be categorized the same way by both methods. In other words, though an estimated NAR may differ significantly from its corresponding actual NAR, it might still be useful--along with the regression equation--in <u>predicting</u> the actual NAR. In our study, we had no perfect correlations for any nutrient but the correlation coefficients between calcium NARs

Figure 4

Possible Relationship Between Any NAR Determined by Food Frequency Method and Corresponding NAR Determined by Standard Method



A. Zero correlation but acceptable predictability



B. Perfect correlation but poor predictability

were high (.85 or greater) for many sex-age groups. Yet, for many of these groups, there was a difference between the two methods of over ten percentage points in the number of individuals with calcium NARs <.60 or ≥.80.

In reviewing the results, while we see nutrient-by-nutrient differences when we compare the two methods, the more compelling differences appear to be among sex-age groups. This was true for all the ways in which we analyzed the results, but was most noticeable when one used each method to identify problem nutrients. There are several possible explanations for these differences. One such explanation is that males and females of various ages differ in the major foods they choose within a food group. A second possible explanation is that sex-age groups differ in the quantities of various foods which they consume.

Since the differences seem to be evident across nutrients, the second explanation appears to be the most likely. Serving size differences for a food such as beef could obviously influence the nutrient intakes of a number of nutrients. Pao et al. (11) reported that for the total NFCS population, 86 grams of beef were consumed per eating occasion at the 50th percentile. This value was used in constructing our nutrient profile and is similar to values determined by Pao et al. for females of all age groups. However, children consumed approximately 50 grams while males, 15 to 64 years of age, consumed 112 grams per eating occasion. A reasonable follow-up to the work that we are presenting would be the construction of three different nutrient profiles, one each for children, adolescent and adult males, and adolescent and adult females, with more appropriate serving sizes selected for each group.

Appendix A. List of Omitted Codes and their Corresponding Frequency of Mention*

NFCS Code	Description	Frequency
00 -	Artificial sweeteners, extracts, flavors, vinegars, seasonings, spices, herbs, vitamins, cooking oil sprays	415
115-5	Puerto Rican code	0
118-25	Whey, sweet, dry	0
118-3015	Cocoa powder	12
118-304	Milk beverage powders w/no NFDM, unreconstituted	4
135-	Milk protein based snack	0
272-12	Puerto Rican code	0
272-21	Puerto Rican code	0
273-11	Puerto Rican code	0
273-21	Puerto Rican code	0
273-31	Puerto Rican code	0
273-35	Puerto Rican code	0
273-42	Puerto Rican code	0
273-51	Puerto Rican code	0
274-13	Puerto Rican code	0
274-21	Puerto Rican code	0
274-22	Puerto Rican code	0
274-404	Puerto Rican code	0
274-41	Puerto Rican code	0
274-51	Puerto Rican code	0
274-61	Puerto Rican code	0
275-2041	Puerto Rican code	0
275-2042	Puerto Rican code	0
275-604	Puerto Rican code	0
275-7	Hors d'oeuvres, finger sandwiches	1
284-	Plain gelatin drinks	2
324-	Meringues	1
424-	Coconut beverages	0
44 -	Carob powder and chips	0
500-1000	Flour	2
581-0113	Puerto Rican code	0
581-0114	Puerto Rican code	0
581-012	Puerto Rican code	0
581-0531	Puerto Rican code	0
581-0532	Puerto Rican code	0
581-0600	Puerto Rican code	0
581-0602	Puerto Rican code	0
581-0612	Puerto Rican code	0
581-0613	Puerto Rican code	0
581-1400	Puerto Rican code	0

[1]Throughout the appendices, when NFCS code numbers are not identified with all seven digits, the shorter code number describes any NFCS code beginning with those numbers (e.g., 541 refers to all seven-digit codes beginning with 541).

Appendix A (continued)

NFCS Code	Description	Frequency
581-2106	Puerto Rican code	0
581-2107	Puerto Rican code	0
581-2109	Puerto Rican code	0
581-2110	Puerto Rican code	0
581-2120	Puerto Rican code	0
581-2131	Puerto Rican code	0
581-2132	Puerto Rican code	0
581-2133	Puerto Rican code	0
581-2134	Puerto Rican code	0
581-3011	Puerto Rican code	0
582-0405	Puerto Rican code	0
582-1101	Puerto Rican code	0
582-12	Puerto Rican code	0
634-0205	Puerto Rican code	0
634-0310	Fruit salad watergate	5
634-0315	Lime souffle	0
711-06	Puerto Rican code	0
719-	Puerto Rican code	0
731-2	Puerto Rican code	0
732-1011	Puerto Rican code	0
732-1111	Puerto Rican code	0
734-2100	Puerto Rican code	0
744-1	Puerto Rican code	0
744-2	Puerto Rican code	0
752-3600	Yeast	4
754-182	Puerto Rican code	0
77 -	Puerto Rican code	0
813-2400	Lecithin	0
813-3011	Puerto Rican code	0
813-2021	Adobo fresco (seasoning)	0
912-	Artificial sweetener	613
913-0210	Bee pollen	0
918-0100	Chewing gum	17
926-	Beverages, not fruit (oatmeal, sugar cane, etc.)	0

Appendix B. List of Food Codes and Their Descriptions Included in Each Food Group.

Whole Milk	
111-0 *	Milk, NFS
111-11 *	Milk, cow's, fluid, whole (regular and low sodium)
111-140*	Milk, cow's, fluid, filled, NFS
111-141*	Milk, cow's, fluid, filled, whole
111-16 *	Milk, goat's, fluid, whole
111-211*	Milk, dry, reconstituted, whole
111-23 *	Milk, goat's, dry, reconstituted
118-11	Milk, whole, dry, not reconstituted
Lowfat Milk	
111-12 *	Milk, cow's, fluid, lowfat (NFS, 1%, 2%, acidophilus)
111-142*	Milk, cow's, fluid, lowfat, filled
111-15 *	Buttermilk, fluid
111-212*	Milk, dry, reconstituted, lowfat
111-22 *	Buttermilk, dry, reconstituted
118-12	Milk, dry, lowfat, not reconstituted
118-20	Buttermilk, dry, not reconstituted
Skim Milk	
111-13 *	Milk, cow's, fluid, skim or nonfat (plain or with NFDM added)
111-20 *	Milk, dry, reconstituted, NFS
111-213*	Milk, dry, reconstituted, nonfat
118-10	Milk, dry, not reconstituted, NFS
118-13	Milk, dry, not reconstituted, nonfat
Flavored Milk	
115-1	Chocolate milk, other flavored milks, not cocoa
115-2	Malted milk
115-3	Eggnog
118-301 (except 118-3015)	Cocoa mix, not reconstituted
118-302	Malted milk mix, not reconstituted
Milk as Condiment	
111-0#	Milk, NFS
111-1#	Milk, fluid (including cow's, goat's, filled, whole, lowfat, skim, buttermilk)
111-2#	Milk, dry, reconstituted (including whole, lowfat, skim, buttermilk)
112-	Milk, evaporated (NFS; diluted or undiluted; whole, lowfat, skim or filled)

*Only if quantity > 61 gms.
#Only if quantity $\leq$ 61 gms.

Appendix B (continued)

Yogurt

114-	Yogurt (NFS, plain, whole, lowfat, flavored, fruited, frozen)

Cheese (Except Cottage)

141-	Natural cheeses
144-	Processed cheeses and cheese spreads
145-	Imitation cheese, cheese food
146-1052	Cheese with nuts (including cheese ball)
146-2020	Cheese dip
146-301	Cheese fondue
146-303	Welsh rarebit

Cottage Cheese

142-	Cottage cheese

Frozen Dairy Desserts

115-4	Milkshakes
118-303	Milkshake mix, not reconstituted
131-	Frozen desserts with milk (including ice cream, ice milk, cones, sundaes, sodas, sherbet)

Cream Pies, Cheesecake

146-101	Cheesecake (including with fruit)
533-4	Cream and custard pies (not chiffon, including pumpkin)
533-6	Cream and custard pies (not chiffon, including yogurt)

Puddings, Custards

132-	Milk desserts, not frozen (including pudding, custard)
133-	Baby food custard or pudding
674-08	Baby food custard or pudding with fruit
674-10	Baby food custard or pudding with fruit
674-13	Baby food custard or pudding with fruit
674-14	Baby food custard or pudding with fruit
674-15	Baby food custard or pudding with fruit
634-0200	Banana pudding
582-0719	Coconut rice pudding

Beef

21 -	Beef, plain, all kinds (except lean meats, organ meats and mixtures)
(except: 211-0112	
211-0122	
212-0112	
212-0122	

Appendix B (continued)

Beef (continued)

212-0132	
212-1111	
213-0412	
213-0422	
214-0112	
214-0712	
214-1012	
214-1612	
214-1720	
215-0130	
215-0131	
215-0132)	
276-1	Beef baby food mixture
272-1002	Beef loaf
272-1005	Corned beef hash
272-1007	Hamburger main dish
272-1008	Beef roast hash
272-1010	Corned beef patty
272-1015	Meat loaf pie
272-6	Meat loaf or hash, NFS
272-1016	Beef Wellington
271-6010	Meatballs

Beef, Trimmed

211-0112	Beef, trimmed or lean only eaten
211-0122	Beef, trimmed or lean only eaten
212-0112	Beef, trimmed or lean only eaten
212-0122	Beef, trimmed or lean only eaten
212-0132	Beef, trimmed or lean only eaten
212-1111	Beef, trimmed or lean only eaten
213-0412	Beef, trimmed or lean only eaten
213-0422	Beef, trimmed or lean only eaten
214-0112	Beef, trimmed or lean only eaten
214-0712	Beef, trimmed or lean only eaten
214-1012	Beef, trimmed or lean only eaten
214-1612	Beef, trimmed or lean only eaten
214-1720	Beef, trimmed or lean only eaten
215-0130	Beef, trimmed or lean only eaten
215-0131	Beef, trimmed or lean only eaten
215-0132	Beef, trimmed or lean only eaten

Pork

22 -	Pork, plain, all kinds (including cured and fresh; excluding lean meats, organ meats, pork mixtures, bacon and salt pork)
(except: 221-0112	
221-0115	
221-0122	
221-0132	

Appendix B (continued)

Pork (continued)

221-0142
221-0702
221-1002
222-0112
222-0122
222-0412
222-0422
223-0112
223-1102
223-1142
223-1145
224-0102
224-0202
224-1102
224-1202
224-2102
226-)

272-2001	Ham loaf (not luncheon meat)
276-2	Pork baby food mixtures

Pork, Trimmed

221-0112	Pork, trimmed or lean only eaten
221-0115	Pork, trimmed or lean only eaten
221-0122	Pork, trimmed or lean only eaten
221-0132	Pork, trimmed or lean only eaten
221-0142	Pork, trimmed or lean only eaten
221-0702	Pork, trimmed or lean only eaten
221-1002	Pork, trimmed or lean only eaten
222-0112	Pork, trimmed or lean only eaten
222-0122	Pork, trimmed or lean only eaten
222-0412	Pork, trimmed or lean only eaten
222-0422	Pork, trimmed or lean only eaten
223-0112	Pork, trimmed or lean only eaten
223-1102	Pork, trimmed or lean only eaten
223-1142	Pork, trimmed or lean only eaten
223-1145	Pork, trimmed or lean only eaten
224-0102	Pork, trimmed or lean only eaten
224-0202	Pork, trimmed or lean only eaten
224-1102	Pork, trimmed or lean only eaten
224-1202	Pork, trimmed or lean only eaten
224-2102	Pork, trimmed or lean only eaten

Other Meats

23 -	Lamb, veal and game (excluding lean cuts, organ meats, and mixtures)

(except: 231-0102
231-0402
231-0702

Appendix B (continued)

Other Meats (continued)

231-1100
231-2202)

Other Meats, Trimmed

231-0102	Lamb, trimmed or lean only eaten
231-0402	Lamb, trimmed or lean only eaten
231-0702	Lamb, trimmed or lean only eaten
231-1100	Lamb, trimmed or lean only eaten
231-2202	Lamb, trimmed or lean only eaten

Poultry

24 - Chicken, turkey, and other poultry (including all parts with skin; excluding skinned poultry, organ meats and mixtures)

(except: 241-0021
241-0023
241-0102
241-0104
241-0106
241-0111
241-0124
241-0221
241-0232
241-0312
241-0322
241-0332
241-0403
241-0404
241-0412
241-0418
241-0422
241-0432
241-0452
241-0512
241-0518
241-0522
241-0532
241-0542
241-0552
241-0612
241-0618
241-0622
241-0632
241-0642
241-0652
241-0712
241-0718
241-0722
241-0732

Appendix B (continued)

Poultry (continued)

241-0742
241-0752
241-0812
241-0818
241-0822
241-0832
241-0842
241-0852
241-0912
241-0918
241-0922
241-0932
241-0942
241-0952
241-1012
241-1018
242-0112
242-0122
242-0132
242-0140
242-0250)

272-4005	Chicken or turkey hash
272-4006	Chicken or turkey cake or patty

Poultry, Skinned

241-0021	Chicken, skinned
241-0023	Chicken, skinned
241-0102	Chicken, skinned
241-0104	Chicken, skinned
241-0106	Chicken, skinned
241-0111	Chicken, skinned
241-0124	Chicken, skinned
241-0221	Chicken, skinned
241-0232	Chicken, skinned
241-0312	Chicken, skinned
241-0322	Chicken, skinned
241-0332	Chicken, skinned
241-0403	Chicken, skinned
241-0404	Chicken, skinned
241-0412	Chicken, skinned
241-0418	Chicken, skinned
241-0422	Chicken, skinned
241-0432	Chicken, skinned
241-0442	Chicken, skinned
241-0452	Chicken, skinned
241-0512	Chicken, skinned
241-0518	Chicken, skinned
241-0522	Chicken, skinned
241-0532	Chicken, skinned

Appendix B (continued)

Poultry, Skinned (continued)

241-0542	Chicken, skinned
241-0552	Chicken, skinned
241-0612	Chicken, skinned
241-0618	Chicken, skinned
241-0622	Chicken, skinned
241-0632	Chicken, skinned
241-0642	Chicken, skinned
241-0652	Chicken, skinned
241-0712	Chicken, skinned
241-0718	Chicken, skinned
241-0722	Chicken, skinned
241-0732	Chicken, skinned
241-0742	Chicken, skinned
241-0752	Chicken, skinned
241-0812	Chicken, skinned
241-0818	Chicken, skinned
241-0822	Chicken, skinned
241-0832	Chicken, skinned
241-0842	Chicken, skinned
241-0852	Chicken, skinned
241-0912	Chicken, skinned
241-0918	Chicken, skinned
241-0922	Chicken, skinned
241-0932	Chicken, skinned
241-0942	Chicken, skinned
241-0952	Chicken, skinned
241-1012	Chicken, skinned
241-1018	Chicken, skinned
242-0112	Turkey, skinned
242-0122	Turkey, skinned
242-0132	Turkey, skinned
242-0140	Turkey, skinned
242-0250	Turkey, skinned

Organ Meats

251-	Organ meats (including liver, heart, brains, tongue, etc.)

Sausage and Luncheon Meats

252-	Frankfurters, sausages, luncheon meats, meat spreads

Fish and Shellfish

26 -	All plain fish and shellfish
272-5	Fish and shellfish with starch (including fish cake, fish loaf, fish fritter)
(except: 272-5009 272-5007 272-5001)	

Appendix B (continued)

Eggs

311-	Eggs, chicken
312-	Other poultry eggs
321-0500	Plain omelet or scrambled egg
34 -	Egg yolk for baby
33 -	Egg substitute

Dried Beans and Peas

411-	Cooked or canned dried beans
412-	Cooked or canned dried bean mixtures
413-	Cooked dried peas and lentils and their mixtures
415-01	Mexican frozen dinner with refried beans
416-	Bean, split pea and lentil soups
417-	Split pea baby food

Nuts, Seeds

421-	Nuts (including peanuts)
422-	Nut butters (including peanut butter)
425-	Nut mixtures (including mixtures with fruit)
431-	Seeds

Soy-Based Supplements

113-	Soy-based imitation milk, not baby formula
414-	Soybean derived products, excluding milk (including tofu, soymeal, high protein bars)
(except: 414-35)	
418-	Meat substitute, mainly vegetable protein

Milk-Based Meal Replacements, Diet Supplements

116-	Meal replacements with milk
118-3080	Instant breakfast, not reconstituted
118-3085	High-calorie milk beverage
118-309	Supplement powders (including high protein)
118-31	Diet powder
118-4	Tiger's milk and milk beverage beads

White Bread

510-	Bread and rolls, NFS (including enriched and not enriched)
511-	Bread and rolls, white (including enriched and not enriched, bagels, English muffins)
581-0401	Dressing with oysters
582-0401	Dumplings
582-0501	Matzoth balls
582-0406	Stuffed derma (casing stuffed with flour and cooked)

Appendix B (continued)

Whole Grain Yeast Bread

512-	Whole wheat bread and rolls
513-	Cracked wheat bread and rolls
514-	Rye bread and rolls
515-	Oatmeal bread and rolls
516-	Multigrain bread and rolls
517-	Cottonseed bread
518-	Other breads (including soy, buckwheat, triticale)

Quick Breads, Tortillas

521-	Biscuits (including enriched, not enriched, whole grain, fried, refrigerated dough)
522-	Corn bread (including muffins, sticks, hushpuppies, tortillas)
523-	Muffins, popovers (including plain, fruit, whole grain, bran, fritters)
524-	Other quick breads (Boston brown, banana nut, zucchini, Irish soda)

Pancakes, French Toast

55 -	Pancakes, waffles, French toast

Grain-Based Snacks

542-	Low sodium grain-based snacks
543-	Non-sweet crackers
544-	Salty snacks (including pretzels, popcorn, corn chips; excluding caramel corn)

(except: 544-031)

Low Sugar Ready-to-Eat Cereal (<10% Sugar)

571-003	Chex, NFS
572-0010	Unprocessed bran
572-05	Bran Chex
573-01	Corn flakes
573-03	Puffed corn
573-07	Corn Chex
574-00	Raw oats
574-01	Cheerios
575-00	Rice cereal, NFS
575-01	Rice Krispies
575-02	Puffed rice
575-05	Rice Chex
575-07	Special K
575-11	Rice polishings
576-01	Wheaties
576-020	Wheat germ, plain
576-03	Puffed wheat
576-050	Shredded wheat

Appendix B (continued)

Low Sugar Ready-to-Eat Cereal (<10% Sugar) (continued)

576-060	Wheat Chex
576-08	Grape Nuts
576-09	Total
577-045	Product 19
577-05	Concentrate
579-0100	Raw millet

Medium Sugar Ready-to-Eat Cereal (10-30% Sugar)

571-001	Ready-to-eat cereal, NFS
571-0101	Buckwheats
572-005	Bran cereal, NFS
572-01	All-Bran
572-02	All Bran Buds
572-03	Bran flakes
572-04	Raisin bran
573-08	Golden Grahams
573-09	Corn Bran
574-04	Granola
574-05	Heartland
574-06	Life
574-07	Oat flakes
574-08	Golden Harvest
576-021	Wheat germ, honey
576-051	Frosted Mini Wheats
576-061	Most
576-07	Grape Nuts Flakes
577-01	Alpen
577-040	Team
577-130	Cracklin' Bran
577-135	Familia

High Sugar Ready-to-Eat Cereal (>30% Sugar)

571-002	Sugared cereal, NFS
573-02	Frosted Flakes
573-04	Sugar Pops
573-05	Cocoa Puffs
573-06	Trix
574-03	Lucky Charms
575-03	Frosted Rice
575-04	Cocoa Krispies
575-08	Rice nuggets with sugar
575-09	Fruity Pebbles
575-10	Cocoa Pebbles
576-04	Sugar Smacks
577-02	Captain Crunch
577-03	Fruit Loops
577-06	King Vitaman
577-07	Captain Crunch Peanut Butter

Appendix B (continued)

High Sugar Ready-to-Eat Cereal (>30% Sugar) (continued)

577-09	Alpha Bits
577-10	Moonstones
577-12	Vanilly Crunch
577-136	Cookie Krisp
574-09	Honey Nut Cheerios

Cooked Breakfast Cereals

562-	Cooked cereals (including cornmeal, grits, millet, oatmeal, cream of wheat, cream of rye, 7-grain cereal, Nestum and cream of rice; excluding rice, kasha and barley)
(except: 562-0500 through 562-0504 562-051 through 562-06 562-004 562-005)	
578-	Baby cereals

Pasta and Rice

561-	Cooked pasta and noodles (including egg, whole wheat, spinach)
562-004	Barley
562-005	Kasha
562-0500	Rice, cooked, NFS
562-0501	Rice, white, cooked
562-0503	Rice, white, cooked, instant
562-0504	Rice, white, cooked, converted
562-051	Rice, brown, cooked or rice gruel
562-052	Rice, wild, cooked
562-053	Rice, wild and brown, cooked
562-060	Rice, long, cooked
581-0603	Noodle pudding
581-2102	Fried rice
581-2130	Rice, stewed with tomato
582-0601	Ricearoni
582-0704	Rice croquette or patty
582-0705	Rice dressing
582-0706	Creamed rice
582-0708	Rice frys
582-0715	Rice pilaf
582-0723	Sushi (rice with vinegar sauce)
582-1103	Soupy rice
585-	Baby food with noodles as main ingredient

Cookies

532- (except: 532-04)	Cookies
541-	Sweet crackers (for example, graham crackers)

Appendix B (continued)

Rich Grain-Based Desserts

531-	Cakes, all kinds (including those with and without icing, filling, whipped cream or fruit topping)
532-04	Brownies
533-	Pies
(except: 533-4	
533-6)	
534-	Cobblers, turnovers, eclairs and other pastries
535-	Danish, breakfast pastries, bars and doughnuts
536-	Coffeecake
634-0104	Apple Brown Betty
634-0105	Apple fritter
634-0202	Banana fritter
634-0206	Peach fritter
634-0207	Cherry fritter
634-0208	Blueberry fritter
634-1401	Rhubarb crisp
674-01	Baby food cobblers and fruit pies
674-02	Baby food cobblers and fruit pies
674-03	Baby food cobblers and fruit pies
674-04	Baby food cobblers and fruit pies
674-05	Baby food cobblers and fruit pies
674-06	Baby food cobblers and fruit pies
674-07	Baby food cobblers and fruit pies
674-12	Baby food cobblers and fruit pies

Citrus Fruit and Juice

611-	Citrus fruit
612	Citrus juice (including mixed juice with pineapple juice)

Melon, Berries

631-09	Cantaloupe
631-10	Cassaba
631-27	Melon, NFS, or honeydew
631-49	Watermelon
632-	Berries (including sweetened)
641-33	Raspberry juice
641-34	Strawberry juice
642-02	Cantaloupe nectar

Other Fruit and Juice

621-	Dried fruits
631-	Fruits, other than citrus, berries, melon or dried (including sweetened)
(except: 631-09	
631-10	
631-27	
631-49)	

Appendix B (continued)

Other Fruit and Juice (continued)

633-	Mixtures of two or more fruits
634-15	Fruit soup
634-0106	Candied apple
634-0201	Banana whip
634-0203	Prune whip
634-0204	Prunes, stuffed with carrot
641-	Juices, other than citrus or berry
(except: 641-33	
641-34)	
642-	Nectar, other than melon
(except: 642-02)	
671-	Strained fruits and baby food
672-	Baby fruit juices
673-0500	Prunes with tapioca
673-0501	Prunes with tapioca
673-0901	Bananas and pineapple with tapioca

Plain Potatoes

710-	Potato, NFS, raw or powdered (excluding sweet potato)
711-	Baked, boiled, canned potato (excluding sweet potato)
(except: 711-0102	
711-0112	
711-0122	
711-0302	
711-0312	
711-06)	
715-	Mashed potatoes
717-	Mixed dishes, mostly potatoes (for example, potato pancake)
765-	Strained potato and ham

Fried Potatoes

582-0578	Knish
712-	Potato chips and sticks
714-	Fried potatoes (including French fries and hash browns)

Tomatoes

741-	Tomatoes, raw
742-	Tomatoes, cooked (including stewed)
743-	Tomato juice, V-8, Clamato
745-0101	Tomato aspic

Tomato Sauce

744-03	Tomato sauce, puree and paste
744-04	Spaghetti sauce

Appendix B (continued)

Condiments

634-0902	Chutney
634-11	Cranberry relish
744-0101	Tomato catsup
744-0201	Chili sauce, tomato based
744-0501	Tomato relish
744-0601	Barbecue sauce
744-0701	Sofrito
755-	Olives, pickles, relishes

Dark Green, Deep Yellow Vegetables

721-	Dark green leafy vegetables
(except: 721-0122	
721-0412	
721-0422	
721-0722	
721-1021	
721-1322	
721-1612	
721-1614	
721-1622	
721-1623	
721-1822	
721-1922	
721-2022	
721-2222	
721-2302	
721-2512	
721-2522	
721-2523	
721-2524	
721-2525	
721-2526	
721-2702	
721-2822	
721-2842)	
722-010	Broccoli, NFS
722-011	Broccoli, canned
722-0121	Broccoli, fresh or frozen
731-010	Carrots, raw
731-0201	Carrots, NFS
731-0230	Carrots, canned
731-05	Carrot juice
732-0100	Pumpkin, NFS
732-1001	Pumpkin, cooked
733-0100	Winter squash, NFS
733-0101	Winter squash, mashed
733-0201	Winter squash, raw
733-0301	Winter squash, baked
734-01	Sweet potato, NFS

Appendix B (continued)

Dark Green, Deep Yellow Vegetables (continued)

734-0301	Sweet potato, baked
734-0501	Sweet potato, boiled
734-0700	Sweet potato, canned
734-0701	Sweet potato, canned
734-0702	Sweet potato, canned in sirup
734-09	Sweet potato, mashed
761-	Dark green vegetables, strained
762-	Deep yellow vegetables, strained

Other Vegetables

731-1100	Peas and carrots, NFS
731-1101	Peas and carrots, cooked
731-1103	Peas and carrots, creamed
731-1130	Peas and carrots, canned
751-	Raw "other vegetables" (including juice)
(except: 751-0302	
751-0303	
751-0304	
751-0401	
751-0501	
751-1104	
751-1105	
751-1302	
751-1303	
751-1305	
751-1310	
751-1311	
751-1312	
751-1321	
751-1322	
751-1350	
751-1351	
751-1352	
751-14	
751-1501	
751-3102)	
752-	Cooked "other vegetables"
(except: 752-0102	
752-0103	
752-0202	
752-0402	
752-0503	
752-0602	
752-0702	
752-0802	
752-0902	
752-1002	
752-1103	
752-1202	

Appendix B (continued)

Other Vegetables (continued)

	752-1302	
	752-1362	
	752-1402	
	752-1502	
	752-1603	
	752-1613	
	752-1623	
	752-1672	
	752-1702	
	752-1802	
	752-1902	
	752-2002	
	752-2102	
	752-2106	
	752-2202	
	752-2302	
	752-2403	
	752-2602	
	752-2702	
	752-2802	
	752-2902	
	752-3102	
	752-3302	
	752-3402)	
753-		Mixtures of other vegetables
(except:	753-0208	
	753-0601	
	753-1102	
	753-1601	
	753-1602)	
754-1402		Stuffed mushrooms
754-3901		Vegetable stew
764-		Strained "other vegetables"
766-		Strained vegetables and meat
767-		Strained vegetables and meat

Cream Soups

147-	Cheese soups
283-45	Poultry cream soups
283-5512	New England clam chowder made with milk
283-5521	Crab soup made with milk
283-5541	Cream of shrimp
283-5542	Cream of shrimp
718-0101	Potato soup made with milk
723-0201	Cream of broccoli
723-2501	Cream of spinach
746-0101	Cream of tomato
746-0603	Tomato vegetable prepared with milk
756-0015	Cream soup, NFS

Appendix B (continued)

Cream Soups (continued)

756-01	Cream of asparagus
756-02	Cream of cauliflower
756-0301	Cream of celery
756-04	Cream of corn and cream of cucumber
756-05	Cream of leek
756-0701	Cream of mushroom
756-09	Cream of pea
756-11	Cream of vegetable
756-12	Cream of zucchini

Other Soups

276-44	Chicken soup, baby's
283-	Meat, fish, or poultry based
(except: 283-45	
283-5512	
283-5521	
283-5541	
283-5542)	
323-	Egg drop soup
584-	Noodle or rice soup
718-	Potato soup
(except: 718-0101)	
723-	Dark green vegetable soups
(except: 723-0201	
723-2501)	
735-	Carrot soup
746-	Tomato based soup
(except: 746-0101	
746-0603)	
756-	Vegetable soups
(except: 756-0015	
756-01	
756-02	
756-0301	
756-04	
756-05	
756-0701	
756-09	
756-11	
756-12)	

Fatty Meats

226-	Bacon, salt pork

Creams

121-	Sweet dairy cream (including whipped)
122-	Cream substitute

Appendix B (continued)

Sauces, Gravies

134-	White sauce, milk gravy
146-5	Cheese sauce
285-	Meat and poultry gravy
813-0	Mayonnaise-based sauces
813-1	Low-calorie tartar sauce

Regular Salad Dressings

831-	Regular salad dressings (i.e., not diet)

Diet Salad Dressings

832-	Low-calorie salad dressing

Spreads, Dips

123	Sour cream (including dip)
143	Cream cheese
146-1051	Cream cheese with nuts
146-2010	Cream cheese-based dip
634-0901	Guacamole
811	Butter and margarine
813-2	Honey butter

Oils, Cooking Fats

812-	Meat drippings, lard, shortening
821-	Vegetable oils

Sugars, Sirups, Jellies

911-	Sugar (including white granulated, powdered, brown, cinnamon and raw)
913- (except: 913-0210)	Sirups, honey, molasses (including corn sirup, chocolate sirup, toppings, other sweet sauces)
914-	Jellies, jams, preserves

Gelatin Dessert

915-	Gelatin desserts (including those with fruit and/or nuts)

Popsicles

916-	Popsicles, ices

Candy

414-35	Soy-based high protein candy bar
544-031	Caramel corn
917-	Candies

Appendix B (continued)

Sugar-Based Beverages

924- (except: 924-2)	Soft drinks, not diet
925-	Fruitades and drinks (including those fortified with vitamin C)
929-	Sugar-based fruit flavored concentrate, not reconstituted

Diet Soda

924-2	Diet soft drinks

Coffee and Tea

921- (except: 921-0013, 921-0104, 921-0304, 921-1404, 921-2100, 921-2101, 921-2102)	Coffee
922-	Coffee substitute
923-0100	Tea
923-0101	Tea
923-0200	Tea
923-0201	Tea
923-0210	Tea
923-03	Tea
923-04	Tea
923-0500	Tea
923-0501	Tea
923-060	Tea
923-0655	Tea

Alcoholic Beverages

931-	Beer
932-	Cordials, liqueurs
933-	Cocktails
934-	Wines
935-	Distilled liquors

Human Milk

110-	Human milk

Baby Formula

117-	Baby formulas

Appendix C. List of Food Mixtures and the Corresponding Combination of Food Groups Which They Represent*

Food Mixtures		Food Groups
NFCS Code	Description	
115-6102	milk, with coffee, no sugar	o milk as condiment
923-0103	tea, with milk	o coffee, tea
923-0203	tea (leaf), with milk	
923-0503	tea (instant), with milk	
115-6101	milk, with coffee, NFS (assume sugar)	o milk as condiment
921-2100	instant coffee with milk and sugar	o sugar, syrup, jelly
921-2102	coffee and cocoa, presweetened	o coffee, tea
281-5005	fish parmesan (frozen meal)	o cheese (except cottage) o fish, shellfish
146-302	cheese souffle	o cheese (except cottage)
321-0501	cheese omelette	o eggs
146-4	cheese sandwiches	o cheese (except cottage) o white bread
581-0112	quesadillas	o cheese (except cottage) o quick breads, tortillas
581-0503	macaroni and cheese	o cheese (except cottage)
581-0519	cheese ravioli, no sauce	o pasta, rice
581-2113	rice casserole with cheese	
581-2211	pasta filled with cheese, no sauce	
585-0800	macaroni and cheese (baby or junior)	
721-2526	spinach and cheese casserole	o cheese (except cottage)
733-0501	winter squash baked with cheese	o dark green, deep yellow vegetable
751-1403	tossed salad, cheese, no dressing	o cheese (except cottage) o other vegetables

*Within separate sections, each food mixture on the left represents a serving of each of the food groups on the right. For example, milk with coffee is considered to be a serving of milk as condiment and a serving of coffee/tea.

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
275-1503 581-0731	steak and cheese sandwich meat and cheese filled turnover	o cheese (except cottage) o beef o white bread
272-1014	beef, noodle and cheese casserole	o cheese (except cottage) o beef o pasta, rice
321-0508	omelette with cheese and ham	o cheese (except cottage) o pork o eggs
275-2032 275-2035 275-2036	ham and cheese sandwich grilled ham and cheese sandwich ham and cheese sandwich on bun	o cheese (except cottage) o pork o white bread
274-306	veal parmigiana	o cheese (except cottage) o other meats o tomato sauce
281-4571	turkey tetrazzini	o cheese (except cottage) o poultry o pasta, rice
275-6012 275-6033	bologna and cheese sandwich frankfurter with cheese on bun	o cheese (except cottage) o sausage, luncheon meats o white bread
581-0525	noodles with tuna and cheese	o cheese (except cottage) o fish, shellfish o pasta, rice
581-0701 581-0711 581-0712	quiche lorraine cheese olive tart cheese filled pastry	o cheese (except cottage) o eggs o pasta, rice
321-0509	omelette with cheese and pizza sauce	o cheese (except cottage) o eggs o tomato sauce

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
751-1423 754-1050	tossed salad, cheese, egg, no dressing chiles rellenos	o cheese (except cottage) o eggs o other vegetables
273-6003 581-0104	burrito with cheese cheese and bean nachos	o cheese (except cottage) o dried beans and peas o quick breads, tortillas
582-0575	pierogies (potato, cheese filled dough)	o cheese (except cottage) o white bread o plain potatoes
581-1101 581-1104	cheese pizza cheese pizza, thick crust	o cheese (except cottage) o white bread o tomato sauce
581-0601	spinach and cheese baked in dough	o cheese (except cottage) o white bread o dark green, deep yellow vegetables
275-2012	bacon and cheese sandwich	o cheese (except cottage) o white bread o fatty meats
581-0505 581-0516 581-0517	macaroni, tomatoes, cheese sauce ravioli, cheese, tomato sauce tortellini with tomato sauce	o cheese (except cottage) o pasta, rice o tomato sauce
581-1103	calzone	o cheese (except cottage) o pasta, rice o oils, cooking fat
754-1206 754-1802	eggplant parmesan casserole zucchini, tomato, cheese casserole	o cheese (except cottage) o tomato sauce o other vegetables
751-1401 751-1402	tossed salad, cheese, NFS tossed salad, cheese, with dressing	o cheese (except cottage) o other vegetables o regular salad dressing

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
275-1042	tacoburger on bun (or chiliburger with cheese)	o cheese (except cottage) o beef o dried beans and peas o white bread
275-1071 275-1072	pizzaburger on half bun pizzaburger on whole bun	o cheese (except cottage) o beef o white bread o tomato sauce
275-1031 275-1032 275-1033 275-1058	cheeseburger, regular condiments, on bun cheeseburger on bun double cheeseburger on bun double hamburger, cheese, condiments, on bun	o cheese (except cottage) o beef o white bread o condiments
275-1502	steak and cheese submarine sandwich	o cheese (except cottage) o beef o white bread o other vegetables
275-1095	Reuben sandwich	o cheese (except cottage) o beef o whole grain yeast bread o other vegetables
273-6006 581-0105 581-0108	chimmi changa meat filled tostado beef taco	o cheese (not cottage) o beef o quick bread, tortillas o other vegetables
581-0502 581-0506 581-0507 581-0510 581-0515 581-2210 583-0102	lasagna meat filled ravioli, tomato sauce cheese filled ravioli, beef sauce pasta, cheese, beef, tomato sauce ravioli, NFS cheese filled manicotti, meat sauce lasagna, cheese, sauce (frozen meal)	o cheese (except cottage) o beef o pasta, rice o tomato sauce
274-6051	antipasto with ham, fish, cheese, vegetables	o cheese (except cottage) o pork o fish, shellfish o other vegetables

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
274-6049	julienne salad (meat, cheese, eggs, vegetables), no dressing	o cheese (except cottage) o pork o eggs o other vegetables
273-2003	pork casserole with pasta, vegetables, cheese	o cheese (except cottage) o pork o pasta, rice o other vegetables
583-0203	macaroni, veal, cheese, sauce (frozen meal)	o cheese (except cottage) o other meats o pasta, rice o tomato sauce
281-3321	veal parmigiana with zucchini (frozen meal)	o cheese (except cottage) o other meats o tomato sauce o other vegetables
275-6037	frankfurter with chili and cheese on bun	o cheese (except cottage) o sausage, luncheon meats o dried beans, peas o white bread
581-1102 581-1105	sausage pizza sausage pizza, thick crust	o cheese (except cottage) o sausage, luncheon meats o white bread o tomato sauce
275-6091	submarine sandwich	o cheese (except cottage) o sausage, luncheon meats o white bread o other vegetables
581-0702	spinach quiche	o cheese (except cottage) o eggs o pasta, rice o dark green, deep yellow vegetables

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
751-1421	tossed salad, cheese, egg, NFS	o cheese (except cottage) o eggs o other vegetables o regular salad dressing
581-0101	enchiladas	o cheese (except cottage) o dried beans, peas o quick breads, tortillas o tomato sauce
581-0102 582-0730	cheese tacos bean and cheese tostado	o cheese (not cottage) o dried beans and peas o quick bread, tortillas o other vegetables
419-	soyburger with cheese, regular condiments	o cheese o soy-based supplement o white bread o condiments
583-0201	macaroni and cheese, apples, peas (frozen meal)	o cheese (except cottage) o pasta, rice o other fruit, juice o other vegetables
581-0106	meat and bean tostado	o cheese (not cottage) o beef o dried beans and peas o quick breads, tortillas o other vegetables
274-6050	julienne salad (meat, cheese, eggs, vegetables), with dressing	o cheese (except cottage) o pork o eggs o other vegetables o regular salad dressing

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
281-3000 281-334	veal dinner, NFS (frozen meal) veal parmigiana, potatoes, vegetable (frozen meal)	o cheese (except cottage) o other meats o plain potatoes o tomato sauce o other vegetables
415-03	cheese enchilada with beans and rice (frozen meal)	o cheese (not cottage) o dried beans and peas o quick breads, tortillas o pasta, rice o tomato sauce
583-0101	lasagna, green beans, dessert (frozen meal)	o cheese (except cottage) o pasta, rice o rich grain-based desserts o tomato sauce o other vegetables
281-1090 281-1092	beef enchiladas (frozen meal) beef enchiladas with chili, rice, beans (frozen meal)	o cheese (not cottage) o beef o dried beans and peas o quick breads, tortillas o pasta, rice o tomato sauce
275-1036	cheeseburger deluxe with bacon	o cheese (except cottage) o beef o white bread o condiments o other vegetables o fatty meats
275-1034 275-1035	cheeseburger, lettuce, tomato, pickle, salad dressing cheeseburger (¼ lb. meat), onion, lettuce, tomato, pickle, special sauce, bun	o cheese (except cottage) o beef o white bread o condiments o other vegetables o regular salad dressing
281-333	veal parmigiana, apple slices, peas, muffin (frozen meal)	o cheese (except cottage) o other meats o quick bread, tortillas o other fruit, juice o tomato sauce o other vegetables

Appendix C (continued)

Food Mixtures		Food Groups
281-335	veal parmigiana, macaroni and cheese, vegetable, dessert cobbler (frozen meal)	o cheese (except cottage) o other meats o pasta, rice o rich grain-based dessert o tomato sauce o other vegetables
146-102	cottage cheese with gelatin dessert	o cottage cheese o gelatin dessert
321-0511	omelette with ground beef and onions	o beef o eggs
274-1011	beef taco filling	o beef o dried beans and peas
275-0	meat sandwich, NFS	o beef o white bread
275-1000	beef sandwich, NFS	
275-1053	hamburger (¼ lb., plain), on bun	
275-1054	double hamburger, on bun	
275-1091	corned beef sandwich	
275-1101	pastrami sandwich	
275-1301	roast beef sandwich	
275-1303	French dip sandwich	
275-1501	steak sandwich	
275-1601	gyros sandwich	
581-0725	meat-filled dumpling	
581-0727	meat-filled bun	
581-0728	dim sums	
581-0107	chalupe	o beef o quick bread, tortillas
581-0111	taquitoes	
581-0301	meat filled crepes	o beef o pancakes, french toast
272-1009	hamburger casserole with corn chips	o beef o grain-based snack
272-1003	beef and noodles	o beef o pasta, rice
276-1010	beef and noodles (baby or junior)	
581-0504	noodles with meat	
581-0518	meat filled wontons	
581-0523	lo mein with meat	

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
272-1013	hamburger and potato pie	o beef o potatoes, plain
281-1011	beef with potatoes (frozen meal)	
271-6001	meat with barbecue sauce	o beef o tomato sauce
274-1003	chili con carne (no beans)	
274-1004	ground beef, tomato sauce	
274-1007	Swiss steak	
274-1013	beef and broccoli	o beef o dark green, deep yellow vegetables
271-6005	beef rolls stuffed with vegetables	o beef o other vegetables
274-1001	beef and green pepper	
274-1005	ground beef casserole with vegetables	
274-1008	ground beef with vegetables (no sauce)	
274-1012	sukiyaki	
274-6001	chow mein with meat (no noodles)	
276-107	beef with vegetables (baby or junior)	
271-1	beef in gravy or sauce or creamed	o beef o sauces, gravies
274-1009	beef, ground, with egg and onion	o beef o eggs
273-6002	burrito	o beef o dried beans and peas o quick bread, tortillas
274-1002	chili con carne with beans	o beef o dried beans and peas o tomato sauce
274-1006	chili, NFS	
275-1011	barbequed beef on bun	o beef o white bread o tomato sauce
275-1041	chiliburger on bun	
275-1070	meatball and spaghetti sauce sandwich	
275-1051	hamburger, condiments, on bun	o beef o white bread o condiments

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
275-1500	steak submarine sandwich	o beef o white bread o other vegetables
272-1006 275-1302	creamed dried beef on toast roast beef sandwich with gravy	o beef o white bread o sauces, gravies
272-1004 273-1004 273-1005	beef and rice with tomato beef and noodles with tomatoes beef and rice with tomatoes	o beef o pasta, rice o tomatoes, juice
281-1070 581-0508 581-0511 585-03 585-09	spaghetti and meatballs (frozen meal) spaghetti, meatballs and tomato sauce pasta, beef, tomato sauce macaroni, tomatoes and beef (baby or junior) spaghetti, tomato sauce and beef (baby or junior)	o beef o pasta, rice o tomato sauce
273-1002 273-1006	cabbage rolls stuffed peppers	o beef o pasta, rice o other vegetables
272-1012 273-1001 273-6005 273-6007 581-0730	beef and rice with sauce beef pot pie meat pie, NFS pinon (meat pie) turnover, meat filled, with sauce	o beef o pasta, rice o sauces, gravies
273-1007 281-1041	corned beef, potatoes, vegetables steak, potatoes, vegetables (frozen meal)	o beef o plain potatoes o other vegetables
272-1011	beef stew with potatoes and gravy	o beef o plain potatoes o sauces, gravies
274-1010	beef stew with vegetables (no potatoes)	o beef o other vegetables o sauces, gravies

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
273-1008	chili con carne with beans and rice	o beef o dried beans and peas o pasta, rice o tomato sauce
273-6004	beef and pork stroganoff with tomatoes	o beef o pasta, rice o tomatoes, juice o sauces, gravies
281-605	meatloaf with tomato sauce, corn, applesauce (frozen meal)	o beef o other fruit, juice o tomato sauce o other vegetables
281-603	meatloaf, tomato sauce, potatoes, vegetable (frozen meal)	o beef o potatoes (plain) o tomato sauce o other vegetables
273-1003	beef stew with vegetables	o beef o plain potatoes o other vegetables o sauces, gravies
273-6000	stew, NFS	
273-6001	goulash	
276-0010	meat stew (baby or junior)	
276-1053	beef stew (toddler)	
281-0100	frozen dinner (NFS)	
281-1000	beef dinner (frozen meal, NFS)	
281-1022	chopped sirloin, gravy, potatoes, vegetables	
281-1030	salisbury steak (frozen meal, NFS)	
281-1031	salisbury steak, gravy, potatoes, vegetables (frozen meal)	
281-1051	beef, gravy, potatoes, vegetable (frozen meal)	
275-1052	hamburger, accompaniments, bun	o beef o white bread o condiments o other vegetables o regular salad dressing
275-1055	double hamburger (eg. Big Mac)	
275-1056	hamburger ($\frac{1}{4}$ lb.), accompaniments, bun	
275-1057	hamburger ($2\frac{1}{2}$ oz.), accompaniments, bun	

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
583-0202	macaroni in meat sauce, apples, corn	o beef o pasta, rice o other fruit, juice o tomato sauce o other vegetables
281-604	meatloaf, tomato sauce, green beans, potatoes, dessert (frozen meal)	o beef o rich grain-based desserts o plain potatoes o tomato sauce o other vegetables
281-1033 281-1035	salisbury steak, gravy, potatoes, corn, cake salisbury steak dinner (large portion)	o beef o rich grain-based desserts o plain potatoes o other vegetables o sauces, gravies
281-1052	beef, potatoes, gravy, peas, apple slices	o beef o other fruit, juice o plain potatoes o other vegetables o sauces, gravies
281-1034	salisbury steak frozen meal with soup	o beef o rich grain-based desserts o plain potatoes o other vegetables o other soups o sauces, gravies
321-0503	ham omelet	o pork o eggs
275-2000 275-2031 275-2043 275-2052	pork sandwich ham sandwich cuban sandwich (pork sandwich) roast pork sandwich	o pork o white bread

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
274-2001	cabbage with ham hocks	o pork o other vegetables
274-2003	ham with vegetables	
274-2006	pork with vegetables	
274-2011	pork and vegetables (Hawaiian)	
276-201	ham with vegetables (baby)	
271-2	pork in sauce or gravy or creamed	o pork o sauces and gravies
274-2002	ham salad	o pork o regular salad dressing
275-2033	ham and egg sandwich	o pork o eggs o white bread
321-0522	pork egg foo yung	o pork o eggs o other vegetables
273-2001	pork, rice, and bean mixture	o pork o dried beans and peas o pasta and rice
275-2051	pork barbecue on bun	o pork o white bread o tomato sauce
275-2054	ham club sandwich	o pork o white bread o other vegetables
275-2034	ham salad sandwich	o pork o white bread o regular salad dressing
273-2005	pork with rice and tomato sauce	o pork o pasta, rice o tomato sauce

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
272-2002	ham and noodles with cream sauce	o pork
272-2003	ham and rice with mushroom sauce	o pasta, rice
273-2002	ham pot pie	o sauces, gravies
273-2004	pork with potatoes and vegetables	o pork o plain potatoes o other vegetables
281-201	ham, fruit sauce, sweet potatoes, vegetable	o pork o dark green, deep yellow vegetables o other vegetables o sauces, gravies
273-3001	shepherd's pie	o other meats o plain potatoes
273-3002	shishkabob	o other meats
274-304	mutton stew, with vegetable (no potato)	o other vegetables
274-305	veal goulash (no potatoes)	
276-301	veal with vegetables (baby or junior)	
271-3	lamb or veal with gravy	o other meats o sauces, gravies
275-3010	veal submarine sandwich	o other meats o white bread o other vegetables
273-3004	lamb, with rice and tomatoes	o other meats o pasta, rice o tomatoes and juice
281-331	veal with spaghetti in tomato sauce (frozen meal)	o other meats o pasta, rice o tomato sauce

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
273-3005	lamb stew with rice and cauliflower	o other meats o pasta, rice o other vegetables o sauces, gravies
273-3003 273-36	lamb stew venison stew with vegetables	o other meats o plain potatoes o other vegetables o sauces, gravies
272-4001 275-4011 275-4014 275-4031	chicken with dumplings chicken sandwich chicken fillet sandwich turkey sandwich	o poultry o white bread
581-0110 581-0201	taco with chicken chicken cornbread	o poultry o quick breads, tortillas
272-4002 272-4007 273-4006 276-400 276-401 581-2105	chicken and noodles chicken almond with rice chicken with noodles and mushrooms chicken and rice (junior) chicken noodle dinner (baby or junior) rice and chicken	o poultry o pasta, rice
274-4002	chicken and tomatoes	o poultry o tomatoes, juice
274-4003 274-4004 274-4005 276-405 276-423	chicken or turkey with vegetables chicken creole chicken with Chinese vegetables chicken with vegetables (baby or junior) turkey with vegetables (baby or junior)	o poultry o other vegetables
271-4	chicken or turkey in sauce or gravy or creamed	o poultry o sauces, gravies
274-4001	chicken or turkey salad	o poultry o regular salad dressing

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
272-4003	chicken croquettes	o poultry o oils, cooking fat
273-4002	chicken, rice and bean mixture	o poultry o dried beans and peas o pasta, rice
275-4013	chicken barbecue sandwich	o poultry o white bread o tomato sauce
281-4511	turkey, carrots, broccoli, stuffing (frozen meal)	o poultry o white bread o dark green, deep yellow vegetable
275-4033	turkey sandwich with gravy	o poultry o white bread o sauces, gravies
275-4012	chicken salad sandwich	o poultry o white bread o regular salad dressing
276-421	turkey, rice, and vegetables (baby or junior	o poultry o pasta, rice o other vegetables
281-4151	chicken or pork chow mein, fried rice, shrimp roll (frozen meal)	
273-4001	chicken or turkey pot pie	o poultry o pasta, rice o sauces, gravies
281-4160	chicken a la king with rice	
273-4003	chicken stew	o poultry o plain potatoes o other vegetables
273-4005	chicken gumbo	
276-403	chicken stew (toddler)	
281-4010	chicken dinner, NFS	
281-407	chicken (fried), potatoes, mixed vegetables (frozen meal)	

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
281-4061 281-4062	chicken (fried) with potatoes (regular portion, frozen meal) chicken (fried) with potatoes (large portion, frozen meal)	o poultry o plain potatoes o oils, cooking fat
281-4015	chicken divan with broccoli	o poultry o dark green, deep yellow vegetables o sauces, gravies
281-4501 281-4502	turkey, dressing, potatoes, gravy (regular portion, frozen meal) turkey, dressing, potatoes, gravy (large portion, frozen meal)	o poultry o white bread o plain potatoes o sauces, gravies
275-2013	bacon and chicken club sandwich	o poultry o white bread o other vegetables o fatty meats
281-4032	chicken and noodles, vegetable, cake (frozen meal)	o poultry o pasta, rice o rich grain-based dessert o other vegetables
273-4004	chicken with noodles, broccoli and cheese sauce	o poultry o pasta, rice o dark green, deep yellow vegetables o sauces, gravies
281-4500 281-4521	turkey dinner, NFS turkey, gravy, dressing, potatoes, vegetable (frozen meal)	o poultry o white bread o plain potatoes o other vegetables o sauces, gravies
281-402	chicken, gravy, potatoes, peas, cobbler (frozen meal)	o poultry o rich grain-based dessert o plain potatoes o other vegetables o sauces, gravies

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
281-408	chicken (fried), potatoes, vegetable, dessert (regular portion, frozen meal)	o poultry o rich grain-based dessert o plain potatoes o other vegetables o oils, cooking fat
281-410	chicken (fried), potatoes, vegetable, dessert (large portion, frozen meal)	
281-4531	turkey, gravy, dressing, potatoes, vegetable, dessert (regular portion, frozen meal)	o poultry o white bread o rich grain-based dessert o plain potatoes o other vegetables o sauces, gravies
281-4561	turkey, gravy, dressing, potatoes, vegetables, dessert (large portion, frozen meal)	
281-4091	chicken (fried), potatoes, vegetable, cornbread, dessert (frozen meal)	o poultry o quick breads, tortillas o rich grain-based desserts o plain potatoes o other vegetables o oils, cooking fat
321-0512	scrambled eggs with sausage and mushrooms	o sausage, luncheon meats o eggs
275-6000	luncheon meat sandwich, NFS	o sausage luncheon meats o white bread
275-6011	bologna sandwish	
275-6032	frankfurter (plain), on bun	
275-6035	pig in blanket (frankfurter wrapped in dough)	
275-605	salami sandwich	
275-607	sausage sandwich	
275-6301	meat spread sandwich	
275-6030	corn dog (frankfurter with cornbread coating)	o sausage, luncheon meats o quick breads, tortillas
281-701	sausage, French toast (frozen meal)	o sausage, luncheon meats o pancakes, French toast
281-702	sausage, pancakes (frozen meal)	
581-2111	rice and sausage	o sausage, luncheon meats o pasta, rice
581-2135	rice with Spanish sausage	

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
274-2004	frankfurters and sauerkraut	o sausage o other vegetables
274-2007	sausage with tomato sauce	o sausage, luncheon meats o tomato sauce
281-703	sausage, egg, coffee cake (frozen meal)	o sausage, luncheon meats o eggs o rich grain-based dessert
275-6038	frankfurter and beef chili, wrapped in tortilla	o sausage, luncheon meats o dried beans and peas o quick breads, tortillas
274-2005 415-02	chili dog beans and franks, frozen dinner	o sausage, luncheon meats o dried beans and peas o tomato sauce
275-6034	frankfurter, regular condiments, on bun	o sausage, luncheon meats o white bread o condiments
581-0521	spaghetti with frankfurters	o sausage, luncheon meats o pasta, rice o tomato sauce
281-606	frankfurter, vegetable, dessert (frozen meal)	o sausage, luncheon meats o rich grain-based desserts o other vegetables
275-6031	corny dog with chili on bun (include chili dog)	o sausage, luncheon meats o dried beans and peas o white bread o tomato sauce
321-0502	fish omelet	o fish and shellfish o eggs

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
275-505	sardine sandwich	o fish and shellfish o white bread
272-5009 581-2104	shrimp with fried rice rice casserole with tuna	o fish and shellfish o pasta, rice
281-5000 281-5011 281-5012 281-52	fish dinner, NFS fish and chips (regular portion, frozen meal) fish and chips (large portion, frozen meal) seafood platter with potatoes (frozen meal)	o fish and shellfish o potatoes, fried
274-5021	fish with tomatoes	o fish and shellfish o tomatoes and juice
274-5004 274-5005 274-5020	shrimp chow mein (no noodles) tuna casserole with vegetables lobster Cantonese	o fish and shellfish o other vegetables
271-5	fish, shellfish in gravy, sauce or creamed	o fish and shellfish o sauces, gravies
274-5001 274-5002 274-5003 274-5006 274-5007 274-5008	crab salad lobster salad salmon salad tuna salad shrimp salad seafood salad	o fish and shellfish o regular salad dressing
272-5001	clam fritter, fried	o fish and shellfish o oils, cooking fat
321-0523	shrimp egg foo yung	o fish and shellfish o eggs o other vegetables

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
275-507	tuna salad sandwich	o fish and shellfish o white bread o regular salad dressing
275-500 275-503	fish sandwich fishburger on bun	o fish and shellfish o white bread o oils, cooking fat
272-5007	salmon croquette (salmon, battered and fried)	o fish and shellfish o pancakes, French toast o oils, cooking fat
581-0512	macaroni, shrimp, tomato sauce	o fish and shellfish o pasta, rice o tomato sauce
273-5004 273-5005 273-5006 281-5101	shad creole with rice shrimp chow mein with noodles shrimp creole with rice shrimp chow mein, egg roll, pepper oriental (frozen meal)	o fish, shellfish o pasta, rice o other vegetables
273-5007 273-5020	tuna pot pie oyster pot pie	o fish, shellfish o pasta, rice o sauces, gravies
581-220	macaroni salad with fish	o fish, shellfish o pasta, rice o regular salad dressing
281-508 281-509	scallops, potatoes, vegetable (frozen meal) shrimp, potatoes, vegetable (frozen meal)	o fish, shellfish o plain potatoes o other vegetables
281-5020 281-5033 281-5034	fish dinner, NFS (diet frozen meal) perch, broccoli, peas and carrots (diet frozen meal) turbot, zucchini, carrots (diet frozen meal)	o fish, shellfish o dark green, deep yellow vegetables o other vegetables

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
273-5001 273-5003 273-5009	fish stew seafood stew lobster gumbo	o fish, shellfish o other vegetables o sauces, gravies
273-5008 273-5010	tuna, pasta and peas in cream sauce mackerel, pasta, peas in sauce	o fish, shellfish o pasta, rice o other vegetables o sauces, gravies
281-505	fish, lemon-butter, starch item, vegetable (frozen meal)	o fish, shellfish o plain potatoes o other vegetables o spreads, dips
281-506	fish (batter-dipped), vegetables, potato (frozen meal)	o fish, shellfish o plain potatoes o other vegetables o oils, cooking fat
322-01 322-02 322-04	egg sandwich, NFS egg muffin sandwich egg sandwich, scrambled	o eggs o white bread
321-0510	egg omelet with potatoes	o eggs o potatoes, fried
321-0504 721-2524	egg omelet with poke greens spinach souffle	o eggs o dark green, deep yellow vegetables
321-0505 321-0506 321-0507 321-0513 751-1413	egg omelet with other vegetables Western omelet mushroom omelet Spanish omelet tossed salad with egg, no dressing	o eggs o other vegetables
321-01	creamed eggs or eggs Benedict	o eggs o sauces, gravies
321-02 321-0300	deviled eggs egg salad	o eggs o regular salad dressing

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
275-2014	bacon and egg sandwich	o eggs o white bread o fatty meats
322-03	egg salad sandwich	o eggs o white bread o regular salad dressing
321-0301 321-04 751-1411 751-1412	egg salad with peas egg salad with lettuce and tomato tossed salad with egg, NFS tossed salad with egg and dressing	o eggs o other vegetables o regular salad dressing
582-0420	manapua filled with bean paste	o dried beans and peas o white bread
581-0103 581-0109 582-0201	tamales tamale casserole bean burrito	o dried beans and peas o quick bread, tortillas
582-0101 582-0700 582-0702	macaroni with beans and lentils rice with stewed beans rice and beans	o dried beans and peas o pasta, rice
582-0703	rice, beans, and tomatoes	o dried beans and peas o pasta, rice o tomatoes, juice
423-01	peanut butter sandwich	o nuts and seeds o white bread
634-0306	fruit dessert with nuts	o nuts and seeds o other fruit, juice
423-03	peanut butter and banana sandwich	o nuts and seeds o white bread o other fruit, juice

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
423-02	peanut butter and jelly sandwich	o nuts and seeds o white bread o sugar, syrup, jellies
747-0100	tomato sandwich	o white bread o tomatoes
275-2011	bacon sandwich	o white bread o fatty meats
275-2015	bacon, lettuce, tomato sandwich	o white bread o other vegetables o fatty meats
733-0401	squash fritter or cake	o pancakes, French toast o dark green, deep yellow vegetables o oils, cooking fat
754-1102	corn fritter	o pancakes, French toast o other vegetables o oils, cooking fat
754-1201	eggplant, with batter, fried	
754-1450	okra, with batter, fried	
754-1502	onion rings, with batter, fried	
754-1801	summer squash, with batter, fried	
754-4020	vegetable tempura	
582-0717	rice with raisins	o pasta, rice o other fruit, juice
582-0718	rice dessert with fruit	
581-0509	spaghetti with tomato sauce	o pasta, rice o tomato sauce
582-0105	macaroni and tomatoes	
582-0701	Spanish rice	
582-0707	brown rice with tomato sauce	
582-0103	macaroni and vegetables	o pasta, rice o other vegetables
582-0710	fried rice with bean sprouts and scallions	
582-0716	rice with vegetables	
582-0720	grape leaves stuffed with rice	
582-1105	rice with pigeon peas	

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
581-0522 581-2103 582-0104	pasta with carbonara sauce rice and gravy creamed macaroni	o pasta, rice o sauces, gravies
582-0102	macaroni salad	o pasta, rice o regular salad dressing
754-1803	summer squash casserole with rice and tomato sauce	o pasta, rice o tomato sauce o other vegetables
722-0202	broccoli and rice, with sauce	o pasta, rice o dark green, deep yellow vegetables o sauces, gravies
581-0501 582-0410	egg roll with shrimp or meat egg roll, filled with vegetable	o pasta, rice o other vegetables o oils, cooking fat
731-0100 731-0212	carrot salad, with raisins carrot salad, with apple	o other fruits o dark green, deep yellow vegetables o regular salad dressing
634-0302 634-0303 634-0304 634-0305	fruit salad with cream fruit salad with cream substitute fruit salad with marshmallow fruit dessert with cream substitute	o other fruit, juice o creams
634-0101 634-0103 634-0301 634-12 634-1301	apple salad with dressing (Waldorf) apple and fruit salad with dressing fruit salad with salad dressing pear salad with dressing pineapple salad with dressing	o other fruit, juice o regular salad dressing
634-1302	pineapple with cream cheese	o other fruit, juice o spreads, dips

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
634-0102	apple and cabbage salad with dressing	o other fruit, juice
751-0303	cabbage salad with apples	o other vegetables
751-0304	cabbage salad with pineapple	o salad dressings
713-	creamed, scalloped, augratin potatoes	o plain potatoes o sauces, gravies
716-	potato salad	o plain potatoes o regular salad dressing
711-0102	white potato, baked, fat added	o plain potatoes
711-0112	white potato, baked, peel eaten, fat added	o spreads, dips
711-0122	white potato, baked, peel only eaten, fat added	
711-0302	white potato, boiled, fat added	
711-0312	white potato, boiled, with peel, fat added	
745-0401	tomatoes and okra	o tomatoes
745-0411	tomatoes and onion	o other vegetables
745-0415	tomatoes and celery	
745-0402	tomatoes and okra, fat added	o tomatoes o other vegetables o spreads, dips
731-1140	carrots in tomato sauce	o tomato sauce o dark green, deep yellow vegetables
753-0601	eggplant in tomato sauce	o tomato sauce
753-1601	zucchini with tomato sauce	o other vegetables
721-1623	escarole, creamed	o dark green, deep yellow vegetables
721-2523	spinach, creamed	
721-2525	spinach, with cheese sauce	o sauces, gravies
722-0123	broccoli, with cheese sauce	
722-0125	broccoli, with cream sauce	
731-0203	carrots, creamed	
731-0204	carrots, glazed	
731-0205	carrots, with cheese sauce	

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
721-1612	endive, chicory, escarole, romaine with salad dressing	o dark green, deep yellow vegetables
721-1614	Caesar salad	o regular salad dressings
721-2512	spinach with dressing	
721-0122	beet greens, added fat	o dark green, deep yellow vegetables
721-0422	chard, added fat	o spreads, dips
721-0722	collards, added	
721-1322	dandelion greens, added fat	
721-1622	escarole, added fat	
721-1822	greens, NFS, added fat	
721-1922	kale, added fat	
721-2022	lamb's-quarters, added fat	
721-2222	mustard greens, added fat	
721-2302	poke greens, added fat	
721-2522	spinach, added fat	
721-2822	turnip greens, added fat	
721-2842	turnip greens, with roots, added fat	
722-0122	broccoli, added fat	
731-0202	carrots, added fat	
733-0102	winter squash, added fat	
734-0302	sweet potato, fat added (baked)	
734-0502	sweet potato, fat added (boiled)	
734-1011	sweet potato, fried	o dark green, deep yellow vegetables o oils, cooking fat
733-0103	winter squash with fat and sugar added	o dark green, deep yellow vegetables
734-0703	sweet potato, canned in syrup, with fat added	o spreads, dips o sugar, syrup, jellies

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
754-01	asparagus, creamed	o other vegetables
754-02	lima beans, creamed	o sauces, gravies
754-03	green beans, creamed	
754-04	wax beans, creamed	
754-05	harvard beets	
754-06	brussel sprouts, creamed	
754-07	cabbage, creamed	
754-0901	cauliflower, creamed	
754-1001	celery, creamed	
754-1101	scalloped corn	
754-13	kohlrabi, creamed	
754-1401	mushrooms, creamed	
754-1501	onions, creamed	
754-16	parsnips, creamed	
754-17	peas, creamed	
754-1804	summer squash with cheese sauce	
754-1805	summer squash, creamed	
754-1810	turnips, creamed	
754-4010	vegetable combinations with sauce	
751-0302	coleslaw	o other vegetables
751-0401	Chinese cabbage salad	o regular salad dressing
751-0501	red cabbage salad with dressing	
751-1104	cucumber with salad dressing	
751-1302	lettuce with dressing	
751-1303	tossed salad	
751-1305	wilted lettuce with bacon dressing	
751-1310	salad with assorted vegetables	
751-1311	lettuce with vegetables with dressing	
751-1321	tossed salad with avocado, NFS	
751-1322	tossed salad with avocado and dressing	
751-1350	salad, NFS	
751-1351	salad, NFS, with dressing	
751-1501	mushrooms with dressing	
751-3102	vegetable salad with dressing	
753-0208	bean salad with dressing	
751-1312	lettuce with vegetables salad, diet dressing	o other vegetables o diet salad dressing
751-1352	salad, NFS, low-calorie dressing	

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
731-1102	peas and carrots with fat added	o other vegetables
751-1105	cucumber and sour cream salad	o spreads, dips
752-0102	artichoke, fat added	
752-0202	asparagus, fat added	
752-0402	lima beans, fat added	
752-0503	green beans, fat added	
752-0602	yellow beans, fat added	
752-0702	bean sprouts, fat added	
752-0802	beets, fat added	
752-0902	brussel sprouts, fat added	
752-1002	Chinese cabbage, fat added	
752-1103	cabbage, fat added	
752-1202	red cabbage, fat added	
752-1302	savoy cabbage, fat added	
752-1362	cassava, fat added	
752-1402	cauliflower, fat added	
752-1502	celery, fat added	
752-1603	corn, fat added	
752-1613	yellow corn, fat added	
752-1623	white corn, fat added	
752-1672	cucumber, fat added	
752-1702	eggplant, fat added	
752-1802	kohlrabi, fat added	
752-1902	mushrooms, fat added	
752-2002	okra, fat added	
752-2102	onions, fat added	
752-2106	green onions, fat added	
752-2202	parsnips, fat added	
752-2302	peas (not dried), fat added	
752-2403	green peas, fat added	
752-2602	peppers, fat added	
752-2702	radish, fat added	
752-2802	rutabaga, fat added	
752-2902	salsify, fat added	
752-3102	pea pods, fat added	
752-3302	summer squash, fat added	
752-3402	turnips, fat added	
753-1102	mixed vegetables, fat added	
753-1602	summer squash, fat added	
752-0103	artichoke in salad oil	o other vegetables o oils, cooking fat
923-0102	tea with cream	o creams
923-0202	tea, leaf, with cream	o coffee, tea

Appendix C (continued)

Food Mixtures		Food Groups
NFCS Code	Description	
923-0105	tea, with cream and sugar	o creams
923-0205	tea, leaf, with cream and sugar	o sugar, syrup, jellies
923-0505	tea, from instant, with cream and sugar	o coffee, tea
921-0013	coffee with sugar, NFS	o sugar, syrup, jellies
921-0104	coffee, from ground, with sugar	o coffee, tea
921-0304	coffee, from instant, with sugar	
921-1404	coffee, decaf, instant, with sugar	
921-2101	coffee from mix, presweetened	
923-0104	tea with sugar	
923-0107	tea with lemon and sugar	
923-0204	tea (leaf) with sugar	
923-0207	tea (leaf) with lemon and sugar	
923-0504	tea (instant) with sugar	
923-0507	tea (instant) with lemon and sugar	
923-0508	tea (instant, low-cal) with lemon and sugar	
923-0650	tea (spiced), presweetened	
923-0661	tea, Russian	

Appendix D. The Frequency, Percent of Mentions, and Assigned Serving Size for the Most Frequently Mentioned Foods Within Each Group.

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Whole Milk				
1111100	Milk, cow's, fluid, whole	5462	68.8	244
1110000	Milk, NFS	2462	31.0	244
Low Fat Milk				
1111211	Milk, cow's, fluid, lowfat 2%	1671	69.0	245
1111200	Milk, cow's, fluid, lowfat	545	22.5	245
1111221	Milk, cow's, fluid, lowfat 1%	98	4.0	245
Skim Milk				
1111300	Milk, cow's, fluid, skim or nonfat	560	70.7	245
1112130	Milk, dry, recon, nonfat	109	13.8	245
1112000	Milk, dry, recon, NFS	83	10.5	245
Flavored Milk				
1151100	Milk, chocolate	184	23.3	250
1151110	Milk, chocolate, whole milk base	165	20.9	250
1151300	Cocoa (or choc) & sug mx, milk added, NFS	89	11.3	250
1151200	Cocoa, hot choc, homemade, NFS	85	10.8	250
1151410	Cocoa, w. sug & dry milk mx, water added	55	7.0	250
1183016	Cocoa (or choc) flvrd bev pwder, not recon	47	6.0	28
1151310	Cocoa (or choc) & sug mx, wh milk added	29	3.7	250
1151120	Milk, chocolate, lowfat milk base	28	3.5	250
1183020	Milk, malted, dry mix, not recon	24	3.0	26
1152100	Milk, malted, choc	19	2.4	250
Milk Condiment				
1111100	Milk, cow's, fluid, whole	1265	38.1	16
1110000	Milk, NFS	1203	36.2	16
1111300	Milk, cow's, fluid, skim or nonfat	189	5.7	16
1121000	Milk, evaporated, NFS	180	5.4	16
1111211	Milk, cow's, fluid, lowfat 2%	175	5.3	16
Yogurt				
1143000	Yogurt, fruit variety, NFS	78	37.1	227
1141000	Yogurt, NFS	50	23.8	227
1146000	Yogurt, frozen dessert	23	11.0	227
1143200	Yogurt, fruit variety, lowfat	18	8.6	227
1141120	Yogurt, lowfat	17	8.1	227
1141100	Yogurt, homemade	8	3.8	227

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Cheese, Not Cottage				
1441020	Cheese, processed, cheddar/amer type	1041	43.2	28
1410010	Cheese, NFS	528	21.9	28
1410401	Cheese, cheddar or american type	264	11.0	28
1410901	Cheese, swiss	169	7.0	28
1442010	Cheese spread, cheddar or amer chse bs	96	4.0	28
1410201	Cheese, brick	81	3.4	28
Cottage Cheese				
1420010	Cheese, cottage, NFS	235	52.9	113
1420101	Cheese, cottage, creamed, lg or sm curd	136	30.6	113
1420401	Cheese, cottage, lowfat (1-2%)	57	12.8	113
Frozen Dairy Desserts				
1311010	Ice cream, flavors, not choc	883	50.1	133
1311011	Ice cream, choc	214	12.2	133
1311000	Ice cream, NFS	163	9.3	133
1315000	Sherbet, all flavors	66	3.7	133
1312050	Ice cream sandwich	45	2.6	133
1313030	Ice milk, flavors, not choc	36	2.0	133
1154220	Thick shake, flavors, not choc, c-out	33	1.9	313
1312010	Ice cream, bar/stick, choc covered	31	1.8	133
1312071	Ice cream cone, NFS	22	1.2	133
1154210	Thick shake, chocolate, carry-out type	22	1.2	300
1154102	Milk shake, chocolate	21	1.2	256
1154100	Milk shake, NFS	20	1.1	320
1154112	Milk shake, fountain type flvrs not choc	18	1.0	320
1312005	Ice cream bar, NFS	17	1.0	49
Cream Pie/Cheesecake				
1461010	Cheesecake	48	20.3	115
5334200	Pie, chocolate cream	35	14.8	120
5334700	Pie, pumpkin	30	12.7	120
5334300	Pie, coconut cream	24	10.1	120
5336000	Pie, sweet potato	19	8.0	120
5334100	Pie, banana cream	19	8.0	120
5334500	Pie, lemon cream	14	5.9	120
5334400	Pie, custard or custard cream	13	5.5	120
1461011	Cheesecake, w. fruit	13	5.5	115
Pudding and Custard				
1321022	Pudding, choc, NFS	71	21.5	130
1320011	Pudding, NFS	53	16.1	128

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Pudding and Custard (continued)				
1322011	Pudding, from dry mix, milk added	38	11.5	130
6340200	Banana pudding	30	9.1	82
1321020	Pudding, cornstarch	20	6.1	128
1321030	Custard, NFS	19	5.8	133
1321041	Pudding, rice, homemade	16	4.8	133
1321050	Pudding, tapioca, NFS	15	4.5	83
1323011	Pudding, canned, whole milk type	9	2.7	142
1322012	Pudding, from dry mix, milk added, choc	9	2.7	130
1321031	Custard, homemade	8	2.4	133
1321051	Pudding, tapioca, homemade	7	2.1	83
1321011	Pudding, bread, homemade	7	2.1	128
Beef				
2150100	Beef, ground, hamburger, cooked	802	17.1	112
2140100	Beef, roast, roasted, NFS as to fat	738	15.7	112
2150112	Beef, ground, hamburger, fried	310	6.6	112
2120100	Beef stk, b'less, cked, L&F or NFS	276	5.9	138
2150010	Beef, ground or patty, cooked, NFS	235	5.0	112
2110100	Beef stk, w. bone, cked, L&F or NFS	229	4.9	138
2726001	Meat loaf, cked	196	4.2	112
2721002	Beef loaf, cked	189	4.0	112
2100020	Beef stk, NFS	185	3.9	112
2110111	Beef stk, w. bone, brled, L&F or NFS	169	3.6	138
2150111	Beef, ground, hamburger, brled	141	3.0	112
2120111	Beef stk, b'less, brled, L&F or NFS	135	2.9	138
2120121	Beef stk, b'less, fried, L&F eat or NFS	130	2.8	138
2150120	Beef, ground, lean, cooked	117	2.5	112
2140700	Beef, pot roast, cooked, NFS as to fat	106	2.3	112
2716010	Meatballs, cked, NFS	97	2.1	112
2141600	Beef, corned beef, cooked, NFS as to fat	66	1.4	112
2110121	Beef stk, b'less, fried, L&F eat or NFS	60	1.3	138
2141000	Beef, stew meat, cooked, NFS as to fat	53	1.1	112
Lean Beef				
2140112	Beef, roast, roasted, lean only eat	59	34.3	112
2150130	Beef, ground, extra lean, cooked	26	15.1	112
2110112	Beef stk, w. bone, brled, lean only	21	12.2	138
2120112	Beef stk, b'less, brled, lean only	20	11.6	138
2140712	Beef, pot roast, cooked, lean only eat	11	6.4	112
2120122	Beef stk b'less, fried, lean only	11	6.4	138
2150132	Beef, ground, extra lean, fried	6	3.5	112
2150131	Beef, ground, extra lean, broiled	6	3.5	112
2141012	Beef, stew meat, cooked, lean only eat	6	3.5	112

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Pork				
2230010	Ham, NFS	367	23.2	70
2231100	Ham, smoked or cured, b'less, cooked	252	15.9	70
2210121	Pork ch, fresh, w. bone, fr, L&F or NFS	215	13.6	104
2210010	Pork ch, NFS	139	8.8	104
2270100	P spareribs, frsh, w. bone, plain/bbq	95	6.0	88
2240010	Pork roast, NFS	69	4.4	112
2230012	Ham, fried, NFS	54	3.4	70
2210100	Pork ch, w. bone, cooked	53	3.3	104
2210111	Pork ch, fresh, w. bone, brld, L&F, eat	48	3.0	104
2231140	Ham, smked or cured, b'less, RTE	46	2.9	70
2270601	Pork, neckbones, cked	35	2.2	56
2210131	P ch, w. bone, brded & cked, +fat/NFS L&F	26	1.6	104
2200010	Pork, NFS	23	1.5	104
2250101	Canadian bacon	13	0.8	21
2220100	Pork steak or ctlt, fresh, w. bone, cooked	13	0.8	104
Lean Pork				
2231102	Ham, smked or cured, b'less, cked, L only	24	34.3	70
2210122	Pork ch, frsh, w. bone, fr, L only eat	10	14.3	104
2231142	Ham, smked or cured, b'less, RTE, L only	7	10.0	70
2210112	Pork ch, frsh, w. bone, brled, L only eat	6	8.6	104
2240202	Pork loin rst, frsh, b'less, cked, L only	5	7.1	112
2230112	Ham, fresh, boneless, cooked, lean only eat	5	7.1	70
2210132	P ch, w. bone, brded & cked, +fat, lean only	4	5.7	104
2320403	Veal ctlt/steak, b'less, brded/flred, cked	22	11.3	112
2320401	Veal ctlt or steak, b'less, cooked	22	11.3	112
2310100	Lamb ch, NFS as to cut, w. bone, cked	17	8.8	123
2322001	Veal, ground or patty, cooked	14	7.2	112
2300010	Lamb, NFS	11	5.7	123
2332120	Venison steak	10	5.2	85
2332110	Venison, b'less, roasted, sliced	10	5.2	85
2320103	Veal ctlt, w. bone, fr, L&F eat	10	5.2	112
2320101	Veal ch, w. bone, cked	7	3.6	112
2320010	Veal, NFS	7	3.6	112
2310400	Lamb loin ch, w. bone, cked	6	3.1	123
2321001	Veal, sliced, b'less, roasted	5	2.6	112
2310010	Lamb ch, NFS	5	2.6	123
2333310	Squirrel, cooked	4	2.1	93
2331000	Rabbit, NFS	4	2.1	85
2322002	Mock chicken legs, cooked	4	2.1	112
2312200	Lamb, b'less, cooked	4	2.1	123
2310700	Lamb shldr ch, w. bone, cked	4	2.1	123
2332210	Deer, bologna	3	1.5	28
2331110	Rabbit, domestic, w. bone, cooked	3	1.5	105
2313200	Lamb, ground or patty, cooked	3	1.5	123

Other Meats. Repeated on next page

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Other Meats				
2320403	Veal ctlt/steak, b'less, brded/flred, cked	22	11.3	112
2320401	Veal ctlt or steak, b'less, cooked	22	11.3	112
2310100	Lamb ch, NFS as to cut, w. bone, cked	17	8.8	123
2322001	Veal, ground or patty, cooked	14	7.2	112
2300010	Lamb, NFS	11	5.7	123
2332120	Venison steak	10	5.2	85
2332110	Venison, b'less, roasted, sliced	10	5.2	85
2320103	Veal ctlt, w. bone, fr, L&F eat	10	5.2	112
2320101	Veal ch, w. bone, cked	7	3.6	112
2320010	Veal, NFS	7	3.6	112
2310400	Lamb loin ch, w. bone, cked	6	3.1	123
2321001	Veal, sliced, b'less, roasted	5	2.6	112
2310010	Lamb ch, NFS	5	2.6	123
2333310	Squirrel, cooked	4	2.1	93
2331000	Rabbit, NFS	4	2.1	85
2322002	Mock chicken legs, cooked	4	2.1	112
2312200	Lamb, b'less, cooked	4	2.1	123
2310700	Lamb shldr ch, w. bone, cked	4	2.1	123
2332210	Deer, bologna	3	1.5	28
2331110	Rabbit, domestic, w. bone, cooked	3	1.5	105
2313200	Lamb, ground or patty, cooked	3	1.5	123

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Lean Other Meats				
2310102	Lamb ch, cut NFS, w. bone cked, L only eat	2	66.7	123
2312202	Lamb, b'less, cooked, lean only eat	1	33.3	123
Poultry				
2410409	Chic, PC, w. bone, NFS, fr, sk eat/NFS	274	11.4	112
2410421	Chic, brst, w. bone (flred), fr, sk eat/NFS	148	6.2	112
2420100	Turkey, NFS	142	5.9	86
2410521	Chic, drmstk & thgh, w. bone, fr, sk eat/NFS	135	5.6	112
2410721	Chic, thgh, w.b., fr, sk eat/NFS	120	5.0	112
2410401	Chic, PC, w. bone, NFS, rsted, sk eat/NFS	110	4.6	112
2410821	Chic, wing, w.b., fr, sk eat/NFS	92	3.8	112
2410441	Chic, brst, w. bone, rsted, sk eat/NFS	87	3.6	112
2410410	Chic, brst, NFS	67	2.8	112
2410411	Chic, brst, w. bone, brled, sk eat/NFS	59	2.5	112
2410408	Chic, PC, w. bone, NFS, brled, sk eat/NFS	56	2.3	112
2410621	Chic, drmstk, w.b., fr, sk eat/NFS	53	2.2	112
2410010	Chicken, NFS	52	2.2	112
2420131	Turkey, b'less, rsted, wh & /dk, NFS as to sk	45	1.9	86
2420111	Turkey, b'less, rsted, wh, sk eat/NFS	44	1.8	86
2410541	Chic, drmstk & thgh, w. bone, rsted, sk/NFS	43	1.8	112
2410710	Chic, thigh, NFS	42	1.7	112
2410405	Chic, PC, w. bone, NFS	40	1.7	112
2410407	Chic, PC, w. bone, NFS (sk eat/NFS)	39	1.6	112
2410741	Chic, thgh, w.b., rsted, sk eat/NFS	37	1.5	112
2410510	Chic, leg (drmstk & thgh), NFS	36	1.5	112
2410020	Chic, b'less, wh & /dk, ckg NFS, sk eat/NFS	33	1.4	112
2410310	Chic, stewed, b'less, wh & /dk, sk NFS	31	1.3	112
2410417	Chic, brst, w. bone, sk eat/NFS	29	1.2	112
2410810	Chic, wing, NFS	28	1.2	112
2410610	Chic, drumstk, NFS	28	1.2	112
2410406	Chic, PC, w. bone, NFS, btred, fr sk eat/NFS	23	1.0	112
2410921	Chic, back, w.b., fr, sk eat/NFS	22	0.9	112
2410841	Chic, wing, w.b., rsted, sk eat/NFS	22	0.9	112
2410402	Chic, PC, w. bone, NFS, stwed	22	0.9	112
2410210	Chic, rster, b'less, wh & /dk, NFS as to sk	22	0.9	112
2410711	Chic, thgh, w.b., brled, sk eat/NFS	21	0.9	112
2410717	Chic, thgh, w.b., brded (bked/fr) sk eat/NFS	20	0.8	112
2410511	Chic, drmstk & thgh, w.b., brled, sk eat/NFS	19	0.8	112
2410617	Chic, drmstk, w.b., sk eat/NFS	18	0.7	112
2410641	Chic, drmstk, w.b., rsted, sk eat/NFS	17	0.7	112
2410551	Chic, drmstk & thgh, w.b., stwed, sk eat/NFS	17	0.7	112
2410451	Chic, brst, w. bone, stwed, sk eat/NFS	17	0.7	112
2420400	Turkey, roll, rsted, sld	16	0.7	86
2410817	Chic, wing, w.b., brded (bked/fr) sk eat/NFS	16	0.7	112
2410811	Chic, wing, w.b. brled, sk eat/NFS	16	0.7	112
2410108	Chic, brler/fry, w. bone, rsted, sk eat/NFS	16	0.7	112

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Lean Poultry				
2410403	Chic, PC, w. bone, NFS, rsted, sk not eat	10	14.3	112
2410442	Chic, brst, w. bone, rsted, sk not eat	6	8.6	112
2410221	Chic, rster, b'less, wh, sk eat/NFS	5	7.1	112
2410842	Chic, wing, w.b., rsted, sk not eat	4	5.7	112
2410418	Chic, brst, w.b., brded, bked/fr, sk not eat	4	5.7	112
2410522	Chic, drmstk & thgh, w. bone, fr, sk not eat	3	4.3	112
2410518	Chic, leg, w. bone, sk not eat	3	4.3	112
2410452	Chic, brst, w. bone, stwed, sk not eat	3	4.3	112
2410422	Chic, brst, w. bone (flred), fr, sk not eat	3	4.3	112
2410111	Chic, w. bone, stwed, sk not eat	3	4.3	112
2410023	Chic, b'less, wh &/dk, brled, sk not eat	3	4.3	112
2420132	Turkey, b'less, rsted, wh &/dk, sk not eat	2	2.9	86
2410752	Chic, thgh, w.b., stwed, sk not eat	2	2.9	112
2410722	Chic, thgh, w.b., fr, sk not eat	2	2.9	112
2410718	Chic, thgh, w.b., brded (bked/fr) sk not eat	2	2.9	112
2410542	Chic, drmstk & thgh, w. bone, rsted, sk not eat	2	2.9	112
2410102	Chic, brler/fry, w. bone, cked, sk not eat	2	2.9	112
2410021	Chic, b'less, wh &/dk, ckg NFS, sk not eat	2	2.9	112
Organ Meats				
2511200	Liverwurst, liver chse, brnschweiger	96	34.9	112
2511010	Beef liver, cked	43	15.6	112
2511000	Liver, NFS	29	10.5	112
2511040	Chic liver, cked	25	9.1	112
2511005	Liver, NFS, brded/fr	15	5.5	112
2511020	Calves liver, cked	11	4.0	112
2517041	Giblets, chic (excluding liver) cked	8	2.9	23
2511015	Beef liver, brded, fr	8	2.9	112
2511030	Pork liver, cked	7	2.5	112
2517021	Chitterlings, cked	4	1.5	63
2517011	Tripe, beef, cked	4	1.5	85
2516000	Tongue, NFS	4	1.5	85
Sausage and Luncheon Meats				
2522041	Bologna, NFS	764	21.8	28
2521011	Frankfurters/weiners, hot dogs, NFS	579	16.5	57
2522141	Pork sausage, frsh bulk, pties/links, cked	493	14.1	57
2523021	Bled ham, luncheon meat	310	8.8	28
2523051	Ham, lunchmeats, chp, prssed, spced	190	5.4	90
2521021	Frankfurter, beef	183	5.2	57
2522150	Salami, NFS	148	4.2	56
2522140	Sausage, NFS	106	3.0	57
2523011	Luncheon meats, NFS	87	2.5	28
2522043	Bologna, beef	65	1.9	28

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Sausage and Luncheon Meats (continued)				
2523061	Luncheon loaf (olive/pickle/pimento)	61	1.7	28
2522131	Polish sausage	53	1.5	76
2522143	Pork sausage, country style/smked, cked	39	1.1	54
2522181	Thuringer	34	1.0	28
2523071	Sandwich loaf, luncheon meats	29	0.8	28
2522191	Vienna sausage, cnd	29	0.8	48
Fish and Shellfish				
2611340	Fish, tuna, NFS	189	16.7	113
2611002	Fish, fr, NFS	84	7.4	113
2611000	Fish, NFS	76	6.7	113
2612000	Fish, fish sticks, NFS	70	6.2	113
2611341	Fish, tuna, canned in oil, drained solids	61	5.4	113
2631401	Shrimp, no shell, btred, brded, fr	32	2.8	68
2631400	Shrimp, NFS (assume brded & fr)	29	2.6	68
2611342	Fish, tuna, canned in water, drained solids	27	2.4	113
2611150	Fish, haddock, cooked, NFS	20	1.8	113
2611130	Fish, flounder, cooked, NFS	20	1.8	113
2611310	Fish, sole, cooked, NFS	19	1.7	113
2615071	Fish, catfish, w. bone, brded, fr	17	1.5	113
2611132	Fish, flounder, fillet, breaded, fried	17	1.5	113
2611131	Fish, flounder, fillet, broiled	17	1.5	113
2631402	Shrimp, cnd/steamed	16	1.4	58
2615280	Fish, sardines, NFS	15	1.3	113
2611093	Fish, cod, fillet, breaded, fried	15	1.3	113
2615201	Fish, perch, w. bone, brded, fr	14	1.2	113
2615070	Fish, catfish, w. bone, cked, NFS	14	1.2	113
2611152	Fish, haddock, fillet, breaded, fried	13	1.1	113
2615273	Fish, salmon, canned	12	1.1	113
2611090	Fish, cod, cooked, NFS	12	1.1	113
2611003	Fish, bkd, NFS	12	1.1	113
2725005	Fish cake, patty, NFS	10	0.9	87
2615270	Fish, salmon, NFS	10	0.9	113
2615400	Fish, trout, w. bone, cked, NFS	9	0.8	113
2615281	Fish, sardines, cnd in oil	9	0.8	113
2631202	Scallops, brded, fr	8	0.7	90
2615271	Fish, salmon, steak, w. bone	8	0.7	113
2611311	Fish, sole, fillet, breaded, fried	8	0.7	113
2631200	Scallops, NFS	7	0.6	90
2615200	Fish, perch, w. bone, cked, NFS	7	0.6	113
2725003	Codfish ball, cake	6	0.5	120
2615403	Fish, trout, w. bone, fr	6	0.5	113
2611155	Fish, haddock, fillet, fried	6	0.5	113
2725030	Mackerel cake, patty, cnd	5	0.4	87
2725016	Tuna cake, patty	5	0.4	87

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Fish and Shellfish (continued)				
2630500	Crab, NFS (white/king meat)	5	0.4	68
2615202	Fish, perch, fillet, brled	5	0.4	113
2615192	Fish, mullet, fillet, fr	5	0.4	113
2615160	Fish, halibut, w. bone, cked, NFS	5	0.4	113
2611001	Fish, btred, fr	5	0.4	113
2725008	Salmon loaf, cked	4	0.4	174
2725004	Crab cake	4	0.4	120
2631203	Scallops, brled	4	0.4	77
2631002	Oysters, brded, fr	4	0.4	60
2631000	Oysters, NFS	4	0.4	86
2630702	Lobster tail, in shell, cked	4	0.4	104
2630700	Lobster, NFS	4	0.4	73
2630200	Clams, NFS	4	0.4	100
2615402	Fish, trout, w. bone, brded, fr	4	0.4	113
2615401	Fish, trout, fillet, brled	4	0.4	113
2615111	Fish, croaker, w. bone, brded, fr	4	0.4	113
2615110	Fish, croaker, w. bone, cked, NFS	4	0.4	113
2615101	Fish, crappie, w. bone, brded, fr	4	0.4	113
2611262	Fish, redfish, fillet, btred, fried	4	0.4	113
2611091	Fish, cod, fillet, broiled, fresh	4	0.4	113
Eggs				
3110500	Eggs, whole, fried	1397	42.3	64
3210500	Omelet or scrambled egg	1019	30.9	64
3110300	Eggs, whole, boiled	453	13.7	64
3110400	Eggs, whole, poached	153	4.6	64
Dried Beans and Peas				
4110400	Pinto, calico, red mexican beans, dry, cked	243	19.1	185
4120803	Pork and beans	206	16.2	128
4120101	Baked beans, NFS	163	12.8	128
4110600	Red kidney beans	116	9.1	185
4110300	Lima beans, dry, cooked	72	5.7	185
4120501	Fried beans	62	4.9	145
4110110	White bean, dry, cooked	53	4.2	185
4120302	Kidney bean salad	37	2.9	130
4110100	Beans, dry, cooked, NFS	33	2.6	185
4160102	Bean w. bacon or pork soup	26	2.0	188
4160101	Bean soup, NFS	25	2.0	188
4120102	Baked beans, w. tomato sauce	24	1.9	128
4110200	Black, brown & bayo bean, dry, cooked	24	1.9	185
4130100	Cowpeas, dry, cooked	21	1.6	102
4120810	Beans, dry, cooked, w. pork	19	1.5	95
4120202	Chili beans, bbq beans, ranch/mex style	19	1.5	128
4110401	Pinto, calico, red mex beans, dry, cked w.f.	16	1.3	185

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Nuts and Seeds				
4220200	Peanut butter	843	76.5	16
4211100	Peanuts	63	5.7	36
4211102	Peanuts, dry, roasted	37	3.4	36
4310200	Sunflower seeds	24	2.2	9
4211600	Walnuts, English	22	2.0	36
4210100	Almonds	19	1.7	36
Soy Based Supplement				
4143001	Protein supplement, powdered	21	30.4	28
4181025	Bacon bits, meatless	15	21.7	2
4181160	Lunch sl, meatless-bf, cn bf, chic, sal, tur	9	13.0	28
4141001	Soybean product: soy nuts	5	7.2	28
1131000	Milk, imitation, fluid, soy base	4	5.8	245
4181040	Breakfast links, patties, slices, meatless	3	4.3	28
4181280	Vegetarian stew	2	2.9	245
4181260	Vegetarian fillets	2	2.9	85
4181190	Soy burger	2	2.9	70
1132000	Milk, soy, fluid, canned, not baby's	2	2.9	245
Milk Based Replacement				
1161200	Instant breakfast, powder, milk added	33	55.0	279
1183080	Instant breakfast, powder, not recon	17	28.3	35
1162100	Diet beverage, liquid, canned	4	6.7	256
White Bread				
5110100	Bread, white	2405	19.6	44
5110110	Bread, white, enriched	2378	19.4	44
5110101	Bread, white, toasted	1403	11.4	44
5115101	Rolls, white, soft, enriched	1352	11.0	40
5110111	Bread, white, enriched, toasted	1139	9.3	44
5100010	Bread, NFS	565	4.6	44
5100011	Toast, NFS	414	3.4	44
5115000	Rolls, white, soft	240	2.0	40
5100020	Rolls, NFS	231	1.9	44
5118601	Muffins, English, NFS	161	1.3	57
5116010	Rolls, cinnamon bun	147	1.2	50
5118201	Bread stuffing	145	1.2	70
5115300	Rolls, white, hard	129	1.0	40
5110701	Bread, French or vienna	126	1.0	40
5116000	Rolls, sweet, NFS	107	0.9	40
5110901	Bread, Italian, Grecian, Armenian	87	0.7	40
5118602	Muffins, English, NFS, toasted	75	0.6	50

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Whole Grain Yeast Bread				
5120101	Bread, whole wheat	852	37.9	50
5120102	Bread, whole wheat, toasted	510	22.7	50
5140101	Bread, rye	333	14.8	50
5130101	Bread, cracked wheat	167	7.4	50
5130102	Bread, cracked wheat, toasted	96	4.3	50
5140102	Bread, rye, toasted	59	2.6	50
5120106	Bread, whole wheat, homemade	41	1.8	50
Quick Breads				
5210401	Biscuits, baking powder type, homemade, NFS	285	15.9	56
5220206	Cornbread, homemade	276	15.4	78
5220100	Cornbread, NFS	240	13.4	78
5210204	Biscuits, baking powder, from refg dough	208	11.6	56
5210100	Biscuits, baking powder/buttermilk type	171	9.5	56
5221510	Tortillas, corn	83	4.6	60
5221500	Tortillas, NFS	78	4.3	60
5221520	Tortillas, wheat	73	4.1	60
5220901	Hush puppies	48	2.7	38
5220601	Cornbread muffins, sticks, rounds	43	2.4	78
5240501	Bread, fruit w/o nuts	32	1.8	45
5230201	Muffins, blueberry, fruit, RTE	31	1.7	45
5230401	Muffins, bran, rounds	30	1.7	40
5221530	Taco shell	30	1.7	24
Pancakes/French Toast				
5510100	Pancakes	322	54.8	81
5520100	Waffles, plain	126	21.4	78
5530100	French toast, plain, NFS	53	9.0	45
5530106	French toast, plain, from home recipe	50	8.5	65
Grain Based Snack				
5432500	Crackers, saltine	672	34.5	12
5430100	Crackers, butter	220	11.3	18
5440102	Salty snacks, corn/cornmeal base, chips	199	10.2	21
5433100	Crackers, soda	155	8.0	12
5440300	Popcorn, NFS	115	5.9	15
5440801	Pretzels, hard	71	3.6	21
5440106	Salty snacks, crn/cornmeal bs, corn-chse	65	3.3	21
5440302	Popcorn, w. butter & salt	61	3.1	15
5430400	Crackers, cheese	52	2.7	12
5432800	Crackers, sandwich, peanut butter/cheese	50	2.6	7
5433400	Crackers, toast thins, rye, wheat, wh flour	48	2.5	10
5440301	Popcorn, plain	41	2.1	15
5440800	Pretzels, NFS	36	1.8	21

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Lo Sugar RTE Cereal				
5730100	Corn flakes, RTE	473	27.9	25
5750100	Rice, oven-popped, RTE	225	13.3	25
5740100	Oats, extruded, RTE	222	13.1	25
5750700	Rice flakes w. wheat gluten, RTE	144	8.5	25
5760500	Wheat, shredded, RTE	124	7.3	50
5760100	Wheat flakes, RTE	103	6.1	25
5760800	Wheat & malt barley granules, RTE	70	4.1	55
5760900	Whole wheat flakes, sug, malt, ftfd, RTE	56	3.3	25
5760200	Wheat germ cereal, RTE	45	2.7	55
5750500	Rice, shredded, RTE	41	2.4	25
5770450	Corn, oats & wheat fl, rice, flaked mix, RTE	38	2.2	35
Med Sugar RTE Cereal				
5720400	Bran flakes w. raisins, RTE	253	30.8	35
5720300	Bran flakes, 40% bran, RTE	104	12.7	35
5720100	All bran, RTE	79	9.6	50
5740400	Oats & wheat, nug, w. fruit, nuts, etc	75	9.1	55
5710010	Cereal, RTE, NFS	69	8.4	25
5740600	Oat flour, soy protein cereal, sugared, RTE	61	7.4	35
5720200	All bran buds, RTE	30	3.6	50
5730800	Cornmeal & wheat flour flakes, RTE	28	3.4	28
5760510	Wheat, shredded, presw, RTE	23	2.8	50
5760700	Wheat & malt barley flakes, RTE	22	2.7	35
Hi Sugar RTE Cereal				
5730200	Corn flakes, sug-coated, RTE	125	17.6	37
5770300	Corn, wheat, oats, sug, frt fla, puffed, RTE	122	17.2	28
5760400	Wheat, puffed, w. sug/sug & hon, RTE	86	12.1	38
5770200	Corn & oats, sugared, RTE	58	8.2	37
5730400	Corn, puffed, presweetened, RTE	44	6.2	28
5730600	Corn, puffed, presw fruit-fla, RTE	36	5.1	28
5770900	Oats, corn, sugared, puff/nuggets, RTE	33	4.7	28
5750300	Rice, oven-popped, presw, RTE	28	3.9	37
5740300	Oats, puffed, sugar-covered, RTE	28	3.9	28
5770915	Corn, oats, sugared, puffed, RTE	24	3.4	20
5730500	Corn, puffed, presw cocoa-fla, RTE	21	3.0	28
5771360	Yellow corn, rice, wht, oat flours, sug, RTE	17	2.4	28
5750400	Rice, puffed, presw + hon/cocoa, RTE	17	2.4	38
Cooked Breakfast Cereal				
5620300	Oatmeal, cooked, NFS	191	19.2	240
5620111	Grits, corn/hominy, cked, quick ckg	112	11.3	184
5620303	Oatmeal, cooked, instant	107	10.8	240

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Cooked Breakfast Cereal (continued)				
5620302	Oatmeal, cked, quick-cooking (1/3 minutes)	89	9.0	240
5620100	Grits, corn or hominy, cooked, NFS	89	9.0	184
5620700	Wheat, cream of or farina, cooked, NFS	82	8.3	245
5620301	Oatmeal, cooked, regular cooking	57	5.7	240
5620101	Grits, corn/hominy, cked, reg ckg	44	4.4	184
5620730	Whole-wheat cereal, cooked, wheat & barley	28	2.8	245
5620121	Grits, corn/hominy, cked, instant	27	2.7	184
5620703	Wheat, cream of/farina, cked, inst. mix & eat	21	2.1	245
5620702	Wheat, cream of/farina, cked, quick-ckg	18	1.8	245
5620720	Whole wheat cereal, cooked	16	1.6	245
5620102	Grits, corn/hominy, cked, reg ckg, w. fat	13	1.3	184
Pasta and Rice				
5620500	Rice, cooked, NFS	801	49.4	165
5613000	Spaghetti, cooked, NFS	170	10.5	140
5611200	Noodles or egg noodles, cooked, NFS	106	6.5	120
5610100	Macaroni, cooked, NFS	81	5.0	140
5620501	Rice, white, cked, reg cooking, buttered	73	4.5	165
5620503	Rice, white, cked, instant or minute	71	4.4	165
5613001	Spaghetti, enriched, cooked	51	3.1	140
5812102	Rice, fried	36	2.2	165
5611600	Noodles, chow mein	34	2.1	120
5820601	Ricearoni	32	2.0	165
5620504	Rice, white, cooked, converted	32	2.0	165
Cookies				
5320600	Cookie, chocolate chip, w. or w/o nuts	440	18.8	21
5320100	Cookie, NFS	186	7.9	26
5323300	Cookie, oatmeal, raisin, NS	180	7.7	26
5320900	Cookie, choc, choc covered/fudge sand	180	7.7	21
5324100	Cookie, sugar, fruit fla, w/w/o nuts	160	6.8	32
5410100	Crackers, NFS	140	6.0	26
5323500	Cookie, peanut	133	5.7	24
5410201	Cracker, graham	117	5.0	26
5324700	Cookie, vanilla wafers	100	4.3	26
5320700	Cookie, choc fudge, w/w/o nuts	61	2.6	26
5322003	Cookie, fig bars	56	2.4	26
5323800	Cookie, sandwich, not choc or van	53	2.3	26
5322202	Cookie, cone shell, ice cream type	46	2.0	5
5324300	Cookie, vanilla sandwich	43	1.8	26
5320500	Cookie, butter	34	1.5	26
5323900	Cookie, shortbread	32	1.4	26
5410101	Crackers, animal	28	1.2	26
5323301	Cookie, oatmeal w. raisins	28	1.2	26

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Cookies (continued)				
5322000	Cookie, fruit-filled bars	26	1.1	26
5321500	Cookie, coconut bars	25	1.1	26
5322300	Cookie, gingersnaps	24	1.0	26
5324200	Cookie, sugar wafers	21	0.9	26
Rich Grain-Based Desserts				
5352011	Doughnuts, cake	196	6.3	43
5330100	Pie, apple	172	5.6	128
5310520	Cake, choc, dev fd/fudge, w. ic, coat/fill	140	4.5	70
5310500	Cake, choc, devils food or fudge, NFS	132	4.3	70
5352000	Doughnuts, NFS	131	4.2	43
5310820	Cake, cupcakes, choc, w. icing or filling	130	4.2	70
5310010	Cake, NFS	112	3.6	63
5311600	Cake, pound, NFS	109	3.5	63
5352111	Doughnuts, raised or yeast	108	3.5	43
5312020	Cake, white, w. icing, NFS	100	3.2	63
5310920	Cake, cupcakes, not choc, w. icing/fill	98	3.2	63
5320400	Cookie, brownies, NFS	74	2.4	20
5312120	Cake, yellow, w. icing, NFS	70	2.3	63
5353000	Breakfast tarts	67	2.2	52
5361000	Coffee cake, NFS	53	1.7	72
5352014	Doughnuts, cake, choc covered	49	1.6	43
5351000	Danish pastries	43	1.4	65
5352114	Doughnuts, jelly	42	1.4	43
5312100	Cake, yellow, NFS	40	1.3	63
5312000	Cake, white, NFS	38	1.2	63
5310100	Cake, angel food, NFS	38	1.2	63
5361010	Coffee cake, crumb/quick bread	35	1.1	52
5354210	Breakfast bars, oats, sug, rais, coconut	33	1.1	42
5310200	Cake, banana or applesauce	33	1.1	63
5310800	Cake, cupcakes, chocolate, NFS	31	1.0	70
5338100	Pie, lemon meringue	30	1.0	120
5312110	Cake, yellow, w/o icing, NFS	30	1.0	63
5330500	Pie, cherry	28	0.9	128
5311000	Cake, fruitcake, light or dark	28	0.9	43
5338500	Pie, pecan	25	0.8	118
6340104	Apple betty	24	0.8	108
5341080	Cobbler, peach	24	0.8	100
5310510	Cake, choc, dev fd/fudge, w/o icing/fill	24	0.8	70
5310526	Cake, choc, dev fd/fudge, w. ic, etc, home rec.	21	0.7	70
5312307	Cake, shcake (sponge) w. whpd crm & frt	20	0.6	63
5310700	Cake, cupcakes, NFS	20	0.6	70
5352121	Doughnuts, custard filled	19	0.6	43
5320401	Cookie, brownie, w/o icing	19	0.6	20
5311620	Cake, pound, w/o icing, NFS	19	0.6	63

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Rich Grain-Based Desserts (continued)				
5345000	Turnovers, dumpling, apple	18	0.6	85
5311700	Cake, spice, NFS	18	0.6	63
5330108	Pie, apple, fried pie	17	0.6	128
5330507	Pie, cherry, individual size or tart	16	0.5	128
5312126	Cake, yellow, w. icing, from home	16	0.5	63
5311900	Cake, upside-down, all fruits, NFS	16	0.5	63
5354110	Breakfast bars, diet meal type	15	0.5	25
5341030	Cobbler, berry	15	0.5	100
5310530	Cake, German chocolate	15	0.5	70
5310400	Cake, carrot, NFS	15	0.5	63
5361017	Coffee cake, w. fruit	14	0.5	72
5311810	Cake, sponge/chiffon, w/o icing, NFS	14	0.5	63
5345210	Pastry, fruit filled	13	0.4	85
5341050	Cobbler, cherry	13	0.4	100
5354000	Breakfast bars, NFS	12	0.4	30
5341010	Cobbler, apple	12	0.4	100
5331100	Pie, rhubarb	12	0.4	128
5330400	Pie, blueberry	12	0.4	128
5330010	Pie, NFS	12	0.4	128
5320410	Cookie, brownies, w. chocolate icing	12	0.4	20
5312308	Cake, shcake (sponge) w. fruit	11	0.4	63
5311720	Cake, spice, w. icing, NFS	11	0.4	63
5311710	Cake, spice, w/o icing, NFS	11	0.4	63
5311540	Cake, oatmeal	11	0.4	63
5330700	Pie, peach	10	0.3	128
5311520	Cake, marble, w. icing, NFS	10	0.3	63
5311300	Cake, jelly roll, NFS	10	0.3	63
5310900	Cake, cupcakes, not chocolate, NFS	10	0.3	63
Citrus Fruit/Juice				
6121062	Orange juice, frzn, unsw (recon w. water)	1331	32.7	187
6121000	Orange juice, NFS	809	19.8	187
6111901	Orange	561	13.8	145
6121001	Orange juice, fresh	436	10.7	187
6110101	Grapefruit	238	5.8	134
6111301	Lemon	95	2.3	8
6120100	Grapefruit juice, NFS	91	2.2	186
6120122	Grapefruit juice, canned, unsweetened	63	1.5	186
6120400	Lemon juice, NFS	56	1.4	15
Melon and Berries				
6310901	Cantaloupe (muskmelon), raw	162	28.6	136
6314901	Watermelon, raw	117	20.7	426
6320711	Cranberries, cooked or canned	81	14.3	35

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Melon and Berries (continued)				
6322301	Strawberries, raw	77	13.6	75
6312701	Melon, honeydew, raw	35	6.2	149
6322360	Strawberries, frozen	24	4.2	128
6322362	Strawberries, frozen, w. sugar	11	1.9	128
6321900	Raspberries, raw, NFS	9	1.6	62
6312700	Melon, NFS	9	1.6	136
Other Fruit/Juice				
6310100	Apples	1112	21.3	138
6310701	Bananas, raw	1041	19.9	119
6310111	Applesauce, stewed apples, NFS	297	5.7	128
6313501	Peaches, raw, NFS	236	4.5	152
6410401	Apple juice	205	3.9	186
6313511	Peaches, cooked or canned	194	3.7	128
6313701	Pears, raw	157	3.0	164
6411601	Grape juice	154	3.0	190
6212510	Raisins	118	2.3	28
6313711	Pears, cooked or canned	113	2.2	128
6310113	Apsc, stewed apples w. sug, apple pie fill	101	1.9	128
6331111	Fruit cocktail, cooked or canned	81	1.6	128
6313514	Peaches, cooked or canned, light sirup	75	1.4	128
6212220	Prunes, dried, cooked	70	1.3	107
6332001	Fruit, mixed, fresh	69	1.3	85
6310501	Avocado, raw	64	1.2	113
6411001	Cranberry juice	61	1.2	127
6314301	Plums, raw, hybrid type	53	1.0	66
6312301	Grapes, raw (European type/adherent skin)	52	1.0	100
6331100	Fruit cocktail, NFS	47	0.9	128
6413201	Prune juice	46	0.9	125
6410101	Apple cider	42	0.8	125
6313500	Peaches, NFS	41	0.8	152
6312300	Grapes, raw, NFS	41	0.8	100
6313101	Nectarine, raw	39	0.7	138
6314111	Pineapple, cked/cnd, tidbits, chunk/slice	38	0.7	106
6310112	Apsc, stwed apples, unsw, frsh, cnd, frzn	36	0.7	128
6313513	Peaches, cked/cnd, in heavy sirup	33	0.6	128
6412401	Pineapple juice	23	0.4	125
6314101	Pineapple, raw	22	0.4	78
6310311	Apricots, cooked or canned	21	0.4	130
6311501	Cherries, sw (queen anne, bing) whole, raw	20	0.4	56
Potatoes, Plain				
7150100	White potato, cooked, mashed	1013	35.2	105
7110101	White potato, baked	702	24.4	105

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Potatoes, Plain (continued)				
7110301	White potato, boiled	482	16.8	122
7100010	White potatoes, NFS	179	6.2	105
7150102	White potato, cked, ms, made w. milk & fat	148	5.1	105
7150104	White potato, cked, mashed, made from dry	117	4.1	105
Potatoes, Fried				
7140100	White potato, cooked, french fried	974	37.3	57
7120101	White potato, chips	804	30.8	18
7140300	White potato, cooked, home fries	417	16.0	85
7140102	White potato, cked, french fr, from frzn	125	4.8	57
7140500	White potato, cooked, hash brown	86	3.3	85
7140101	White potato, cked, french fr, from frsh	86	3.3	57
Tomatoes and Juice				
7410100	Tomatoes, raw	1688	86.3	62
7430110	Tomato juice	106	5.4	182
Tomato Sauce				
7440301	Tomato sauce	121	62.4	60
7440401	Spaghetti sauce	61	31.4	62
Condiments				
7550601	Mustard	797	36.5	5
7440101	Tomato catsup	651	29.8	15
7550301	Cucumber pickles, dill	207	9.5	30
7550400	Pickles, NFS	126	5.8	30
7550304	Cucumber pickles, sweet	81	3.7	30
7440601	Barbecue sauce	69	3.2	16
7550302	Cucumber pickle, relish	68	3.1	30
Dark Green/Dark Yellow Vegetables				
7310201	Carrots, NFS (cooked)	273	18.6	75
7310101	Carrots, raw	238	16.3	31
7220121	Broccoli, cooked from fresh or frozen	183	12.5	90
7212521	Spinach, cooked, fresh or frozen	80	5.5	103
7330100	Squash, NFS	63	4.3	108
7220100	Broccoli, NFS	54	3.7	90
7340301	Sweet potato, baked, from fresh	47	3.2	114
7340100	Sweet potato, NFS	45	3.1	114
7212530	Spinach, canned	44	3.0	103
7310230	Carrots, canned	40	2.7	75

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Dark Green/Dark Yellow Vegetables (continued)				
7210721	Collards, cooked, fresh or frozen	40	2.7	90
7340101	Sweet potato, candied	39	2.7	114
7212500	Spinach, NFS	32	2.2	103
7330301	Squash, winter type, baked	30	2.0	108
7212821	Turnip greens, cooked, fresh or frozen	28	1.9	78
7212221	Mustard greens, cooked, fresh or frozen	26	1.8	73
7211800	Greens, NFS	26	1.8	75
7211611	Endive, chicory, escarole, romaine, raw	24	1.6	63
7212800	Turnip greens, NFS	18	1.2	80
Other Vegetables				
7511300	Lettuce, NFS	1837	21.5	28
7520501	Beans, green string, cooked	626	7.3	70
7511304	Lettuce, tossed sal, assort veg, no drsg	597	7.0	93
7522401	Peas, green, cooked or NFS	439	5.1	85
7511702	Onion, mature or NFS, raw	408	4.8	18
7520502	Beans, green string, cooked, no fat	402	4.7	70
7521602	Corn, cooked, no fat	317	3.7	83
7522402	Peas, green, cooked, no fat	297	3.5	85
7521601	Corn, cooked, NFS	262	3.1	83
7511100	Cucumber, NFS	260	3.0	70
7521604	Corn, on the cob, cooked	240	2.8	77
7510900	Celery, NFS	234	2.7	28
7521605	Corn, cream style	167	2.0	128
7521101	Cabbage, cooked or NFS	162	1.9	145
7520500	Beans, string, NFS	124	1.4	70
7531100	Mix veg (corn, limas, peas, gr bean, car), NFS	109	1.3	94
7520400	Beans, lima, immature, cooked or NFS	108	1.3	88
7512210	Pepper, sweet, green, raw	90	1.1	30
7522300	Peas, cow, field, bleye pea, n dr, cked/NFS	89	1.0	88
7511313	Lettuce w. veg salad, no drsg, exc tom & car	86	1.0	93
7523000	Sauerkraut	84	1.0	75
7522100	Onions, cooked	74	0.9	112
7521600	Corn, NFS	69	0.8	83
7512500	Radish, raw, or NFS	67	0.8	24
7511353	Salad, NFS, no dressing	64	0.7	93
7523300	Squash, summer, cooked, or NFS	62	0.7	108
7520201	Asparagus, cooked	59	0.7	93
7511701	Onions, young green, raw	58	0.7	18
7521400	Cauliflower, cooked or NFS	57	0.7	93
7520800	Beets, cooked or NFS	56	0.7	88
7520803	Beets, pickled	54	0.6	88
7522000	Okra, cooked or NFS	45	0.5	95
7520801	Beets, cooked, no fat	45	0.5	88
7520900	Brussel sprouts, cooked or NFS	44	0.5	80
7521612	Corn, yellow, cooked, no fat	40	0.5	83

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Cream Soups				
7460101	Tomato soup, cream of	36	26.5	245
2834511	Chic soup, cream of, NFS	28	20.6	245
7180101	Potato soup (prepared w. milk)	16	11.8	245
7560701	Mushroom soup, cream of (prepared w. milk)	11	8.1	245
7560401	Corn soup, cream of (prepared w. milk)	11	8.1	245
7560301	Celery soup, cream of (prepared w. milk)	10	7.4	245
2835512	Clam chowder, New England (prep w. milk)	6	4.4	245
2834513	Chic soup, cream of (prep w. water)	6	4.4	245
Other Soups				
5840301	Chicken noodle soup	274	19.2	245
7564901	Veg soup, NFS (prep w. water)	235	16.5	245
7460201	Tomato soup, NFS (prepared w. water)	133	9.3	245
7565102	Veg beef soup (prepared w. water)	94	6.6	245
2834051	Chic or turkey soup	57	4.0	245
5840401	Chicken rice soup	51	3.6	245
7560700	Mushroom soup, NFS	44	3.1	245
2834011	Chic, broth, bouillon, consomme	40	2.8	245
2831011	Beef, broth, bouillon, consomme	37	2.6	245
2831510	Soup, bf, veg, w. pot, stew type	34	2.4	245
5840701	Instant soup, noodle	32	2.2	245
7560010	Soup, NFS	29	2.0	245
7565105	Veg chic/turkey soup (prep w. water)	27	1.9	245
5840201	Beef noodle soup	26	1.8	245
2835021	Clam chowder, NFS	18	1.3	245
2834061	Soup, chic, stew type	18	1.3	245
5840010	Noodle soup, canned, RTE	17	1.2	245
7565101	Veg bean soup (prep w. water)	15	1.1	245
7564501	Pea soup, NFS (prepared w. water)	15	1.1	245
7180100	Potato soup, NFS	15	1.1	245
2831021	Chili beef soup	12	0.8	245
5840101	Barley soup	11	0.8	245
7565103	Veg soup w. broth (prepared w. water)	9	0.6	245
7564302	Onion soup (prepared w. water)	9	0.6	245
5840700	Instant soup, NFS	9	0.6	245
7460501	Tomato rice soup (prepared w. water)	8	0.6	245
5840302	Chicken noodle soup, undiluted	8	0.6	245
5840801	Won-ton soup	7	0.5	245
2834031	Chic gumbo soup	7	0.5	245
Fatty Meats				
2260100	Bacon, smoked or cured, cooked	1347	94.6	16

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Creams				
1221040	Cream substitute, powdered	675	35.8	2
1210010	Cream, NFS	484	25.7	15
1212010	Cream, half & half	236	12.5	15
1220010	Cream substitute, NFS	133	7.1	15
1221010	Cream substitute, frozen	74	3.9	15
1222020	Whipped topping, nondairy, frozen	72	3.8	9
1214000	Cream, whipped, NFS	60	3.2	8
Sauces and Gravies				
2850000	Gravies, meat, poultry (prep w. water), NFS	835	77.2	30
1341200	Milk gravy, quick gravy	118	10.9	31
8130205	Tartar sauce, regular	46	4.3	28
Regular Salad Dressings				
8310700	Mayonnaise, regular	1189	41.9	14
8310600	Italian dressing (vinegar & oil; garlic)	398	14.0	16
8310400	French dressing	297	10.5	30
8311000	Mayonnaise type dressing	279	9.8	15
8310010	Salad dressing, NFS	206	7.3	16
8311400	Thousand island dressing	170	6.0	15
8310100	Blue or roquefort cheese dressing	111	3.9	15
Diet Salad Dressings				
8320700	Thousand island dressing, low calorie	29	27.1	30
8320200	Frensh dressing, low calorie	23	21.5	30
8320500	Italian dressing, low calorie	21	19.6	29
8320800	Vinegar, sugar & water dressing	10	9.3	30
8320010	Salad dressing, low calorie, NFS	8	7.5	32
Spreads, Dips				
8110200	Margarine, NFS	3859	56.7	7
8110100	Butter, reg or melted, salted or unsalted	2362	34.7	7
Oils, Cooking Fat				
8210100	Veg oil, NFS	19	20.7	27
8210200	Corn oil	17	18.5	27
8210010	Oil, NFS	17	18.5	27
8210400	Olive oil	15	16.3	27
8120100	Bacon grease or meat drippings	8	8.7	7
8120200	Lard	7	7.6	7

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Sugars, Syrup, Jellies				
9110101	White sugar, granulated or lump	4821	60.6	8
9140100	Jellies, all fruits	975	12.3	19
9110100	Sugar, NFS	675	8.5	8
9130201	Honey	317	4.0	14
9140200	Jam, preserves, all fruits	313	3.9	20
9130001	Sirup, NFS	180	2.3	62
Gelatin				
9150101	Gelatin dessert	300	57.4	120
9150102	Gelatin dessert w. fruit	188	35.9	120
Popsicles				
9161100	Popsicle	98	86.0	57
Candy				
9174502	Hard candies	94	11.5	30
9170501	Chocolate, milk, plain, NFS	93	11.4	30
9171500	Fudge, caramel & nut, chocolate-coat	68	8.3	30
9170001	Candy, NFS	43	5.3	30
9172611	Nougat w. caramel, chocolate covered	39	4.8	30
9170502	Chocolate, milk	36	4.4	30
9170701	Fondant, chocolate covered	33	4.0	30
9174601	Sugar coated chocolate discs	28	3.4	30
9173400	Peanut butter, chocolate-covered	28	3.4	30
9170504	Chocolate, milk w. nuts	28	3.4	30
9174503	Jelly beans	27	3.3	30
9170700	Fondant, NFS	27	3.3	30
9174501	Gumdrops	20	2.4	30
9172100	Licorice	20	2.4	30
9170600	Coconut candy, chocolate covered	20	2.4	30
9172300	Marshmallows, marshmallow creme	19	2.3	30
9171805	Honey-combed hard cdy w. pnutbutr, choc cov	19	2.3	30
9170302	Caramel, plain/flavorings not choc	17	2.1	30
9173100	Peanuts, chocolate covered	15	1.8	30
9173200	Peanut bar	13	1.6	30
9170301	Caramel, chocolate-covered roll	11	1.3	30
9175000	Taffy, NFS	10	1.2	30
9171300	Fudge, NFS	10	1.2	30
5440314	Popcorn, caramel coated, w. nuts	10	1.2	28
9170304	Caramel, chocolate or chocolate covered	8	1.0	30
5440313	Popcorn, caramel coated	6	0.7	35

Appendix D (continued)

Food Group and Frequently Mentioned Codes	Description	Frequency	Percent of Mentions	Serving Size(g)
Sugar-Based Drinks				
9241031	Soft drink, cola-type	3428	52.1	308
9243100	Soft drink, ncarb, pwder mix w. sug, frt fla	923	14.0	248
9241051	Fruit fla sodas	661	10.0	296
9254200	Fruit fla drinks + hi vit C, dr mix, hi sug	225	3.4	250
9251071	Fruit punch	211	3.2	250
9251101	Lemonade	198	3.0	250
9241071	Root beer	151	2.3	296
9251061	Fruit drinks	102	1.6	250
9241061	Ginger ale	88	1.3	296
Diet Soda				
9242000	Special dietary dnk, carb w. artif swtner	690	100.0	296
Coffee/Tea				
9210101	Coffee, from ground black	2849	21.1	240
9210000	Coffee, NFS	2025	15.0	240
9210301	Coffee, from powdered instant, black	1988	14.7	240
9230100	Tea, NFS	1823	13.5	240
9230200	Tea, leaf	1530	11.3	240
9210100	Coffee, ground, NFS	808	6.0	240
9230500	Tea, made from powdered instant, NFS	592	4.4	240
9210300	Coffee, from powdered instant, NFS	537	4.0	240
Alcoholic Beverages				
9310100	Beer, ale	773	51.7	360
9340100	Wine, table, dry	233	15.6	174
9350200	Whisky	174	11.6	56
9340200	Wine, dessert, sweet	49	3.3	174
9310200	Beer, lite	46	3.1	360
9330117	Bourbon & soda or scotch & soda	36	2.4	56
9350300	Gin, vodka	33	2.2	56
9320100	Cordials or liqueurs	21	1.4	20

Appendix E

Food Group Nutrient Profiles

Food Group	Energy	Pro	Fat	Cho	Ca	Fe	Mag	Phos	Vit A	Thia	Ribo	Nia	Vit B6	Vit B12	Vit C
	Kcal	gm.	gm.	gm.	mg.	mg.	mg.	mg.	I.U.	mg.	mg.	mg.	mg.	mcg.	mg.
1. Whole Milk	149	8.1	8.1	11.5	290	0.2	32	227	307	0.10	0.39	0.2	0.10	0.88	2
2. Low Fat Milk	124	8.6	4.6	12.2	314	0.2	34	245	500	0.10	0.42	0.2	0.12	0.93	2
3. Skim Milk	84	8.3	0.4	11.9	296	0.0	27	241	510	0.10	0.36	0.2	0.09	0.92	2
4. Flavored Milk	197	7.8	7.5	25.7	262	0.6	37	237	269	0.10	0.37	0.3	0.10	0.80	3
5. Milk Condiment	17	1.1	0.7	1.6	40	0.0	4	31	55	0.01	0.05	0.0	0.01	0.11	0
6. Yogurt	195	10.3	3.0	32.4	355	0.2	36	280	125	0.09	0.41	0.2	0.10	1.10	2
7. Cheese, Not Cottage	107	6.6	8.7	0.6	191	0.1	7	178	309	0.0	0.10	0.0	0.02	0.23	0
8. Cottage Cheese	112	14.1	4.6	3.1	68	0.1	6	149	165	0.02	0.18	0.1	0.08	0.70	0
9. Frozen Dairy Desserts	276	5.1	13.6	34.9	184	0.2	20	146	534	0.08	0.34	0.2	0.07	0.67	1
10. Cream Pie/Cheesecake	293	6.2	14.4	35.5	96	1.1	23	138	962	0.10	0.26	0.7	0.07	0.50	2
11. Pudding and Custard	156	4.6	4.6	25.3	122	0.3	16	105	197	0.04	0.19	0.2	0.06	0.34	1
12. Beef	410	27.2	32.2	0.9	16	3.5	26	225	61	0.07	0.21	5.3	0.43	1.62	0
13. Lean Beef	266	35.7	12.6	0.0	15	4.4	33	292	21	0.09	0.27	6.7	0.58	1.87	0
14. Pork	272	18.8	21.1	0.1	9	2.4	18	181	1	0.57	0.19	3.8	0.31	0.34	0
15. Lean Pork	148	17.8	7.8	0.5	9	2.3	17	168	5	0.54	0.18	3.6	0.28	0.34	0

Appendix E (continued)

Food Group	Energy	Pro	Fat	Cho	Ca	Fe	Mag	Phos	Vit A	Thia	Ribo	Nia	Vit B6	Vit B12	Vit C
	Kcal	gm.	gm.	gm.	mg.	mg.	mg.	mg.	I.U.	mg.	mg.	mg.	mg.	mcg.	mg.
16. Other Meats	307	26.9	20.9	1.0	14	2.6	21	237	1	0.10	0.25	5.8	0.33	1.43	0
17. Lean Other Meats	248	34.1	11.4	0.0	14	2.5	28	271	0	0.19	0.34	7.4	0.42	2.69	0
18. Poultry	266	30.2	14.5	1.6	17	1.5	26	204	111	0.08	0.19	9.0	0.44	0.33	0
19. Lean Poultry	213	32.7	8.0	0.2	16	1.3	28	220	57	0.08	0.19	10.5	0.52	0.36	0
20. Organ Meats	279	23.1	18.2	4.2	15	8.8	17	349	28531	0.22	2.82	12.4	0.55	44.05	15
21. Sausage & Lunch Meats	158	7.5	13.4	0.5	4	0.9	6	55	0	0.16	0.11	1.4	0.10	0.59	1
22. Fish and Shellfish	214	23.9	10.5	6.1	40	1.6	36	237	106	0.07	0.12	5.7	0.26	2.14	1
23. Eggs	105	7.0	7.9	1.0	40	1.2	8	107	356	0.04	0.17	0.1	0.07	0.76	0
24. Dried Beans and Peas	195	10.8	2.8	32.3	76	3.4	70	205	60	0.16	0.08	1.0	0.26	0.14	1
25. Nuts and Seeds	110	4.6	9.5	3.5	14	0.4	38	76	0	0.03	0.03	2.6	0.06	0.00	0
26. Soy Based Supplement	81	9.8	2.4	6.2	39	1.0	37	97	213	0.08	0.09	0.8	0.14	0.17	2
27. Milk Based Replacement	229	12.1	6.2	31.8	239	2.0	99	201	1188	0.36	0.35	5.1	0.46	0.90	26
28. White Bread	128	3.9	1.9	23.3	53	1.1	10	44	7	0.16	0.11	1.5	0.02	0.00	0
29. Whole Grain Bread	130	5.3	1.4	26.0	63	1.2	35	106	0	0.14	0.08	1.5	0.09	0.00	0
30. Quick Breads	181	4.4	5.4	28.4	60	1.2	15	153	65	0.19	0.17	1.6	0.06	0.06	0
31. Pancakes/French Toast	178	5.7	5.7	25.7	101	1.0	13	141	118	0.17	0.22	1.4	0.06	0.27	0
32. Grain Based Snacks	70	1.2	2.6	9.8	10	0.5	6	26	13	0.04	0.04	0.5	0.01	0.00	0

Appendix E (continued)

Food Group	Energy	Pro	Fat	Cho	Ca	Fe	Mag	Phos	Vit A	Thia	Ribo	Nia	Vit B6	Vit B12	Vit C
	Kcal	gm.	gm.	gm.	mg.	mg.	mg.	mg.	I.U.	mg.	mg.	mg.	mg.	mcg.	mg.
33. Lo Sugar RTE Cereal	111	3.3	0.6	23.6	13	3.0	24	70	1143	0.38	0.40	4.7	0.45	0.43	12
34. Med Sugar RTE Cereal	121	3.8	0.8	30.5	33	4.1	69	169	1195	0.52	0.60	5.9	0.48	0.55	6
35. Hi Sugar RTE Cereal	127	1.7	0.7	28.6	6	2.8	12	27	1206	0.42	0.49	5.4	0.61	0.96	15
36. Cooked Cereal	118	3.8	1.4	22.5	21	1.6	32	90	39	0.14	0.05	0.5	0.04	0.00	0
37. Pasta and Rice	186	4.2	1.6	37.6	16	1.4	17	55	25	0.19	0.05	1.6	0.05	0.02	0
38. Cookies	111	1.5	4.2	17.5	11	0.6	12	32	25	0.06	0.07	0.6	0.01	0.00	0
39. Rich Gr. Based Desserts	223	2.9	9.2	33.5	34	0.9	13	69	136	0.10	0.11	0.9	0.03	0.07	1
40. Citrus Fruit/Juice	77	1.2	0.2	18.5	23	0.3	18	28	314	0.15	0.03	0.5	0.07	0.00	77
41. Melon & Berries	65	1.0	0.4	16.1	18	0.9	19	22	2082	0.06	0.06	0.6	0.12	0.00	35
42. Other Fruit/Juice	92	0.7	0.6	22.9	10	0.6	17	20	292	0.04	0.04	0.5	0.18	0.00	9
43. Potatoes, Plain	93	2.3	2.2	16.5	17	0.5	22	55	85	0.09	0.04	1.3	0.17	0.03	15
44. Potatoes, Fried	153	2.1	8.3	18.1	9	0.6	18	55	18	0.07	0.04	1.6	0.09	0.00	10
45. Tomatoes & Juice	15	0.7	0.1	3.2	8	0.4	9	18	611	0.04	0.03	0.5	0.06	0.00	15
46. Tomato Sauce	30	1.4	1.0	4.7	15	0.5	12	25	742	0.04	0.06	0.6	0.09	0.00	9
47. Condiments	11	0.2	0.2	2.3	5	0.2	3	5	77	0.00	0.00	0.1	0.01	0.00	1
48. Deep Green/Dark Yellow	41	1.6	0.8	7.8	53	0.8	22	34	5644	0.05	0.09	0.5	0.11	0.00	25
49. Other Vegetables	33	1.5	0.9	5.8	15	0.5	12	31	454	0.06	0.04	0.5	0.06	0.00	7

Appendix E (continued)

Food Group	Energy	Pro	Fat	Cho	Ca	Fe	Mag	Phos	Vit A	Thia	Ribo	Nia	Vit B6	Vit B12	Vit C
	Kcal	gm.	gm.	gm.	mg.	mg.	mg.	mg.	I.U.	mg.	mg.	mg.	mg.	mcg.	mg.
50. Cream Soups	176	6.4	8.9	17.8	167	0.9	22	151	585	0.08	0.25	0.9	0.10	0.86	21
51. Other Soups	84	3.9	2.6	11.3	18	0.8	8	49	1257	0.04	0.06	1.4	0.07	0.17	3
52. Fatty Meats	98	4.9	8.3	0.5	2	0.5	4	36	0	0.08	0.05	0.8	0.05	0.16	0
53. Creams	17	0.3	1.4	1.0	7	0.0	1	11	37	0.00	0.01	0.0	0.00	0.02	0
54. Sauces & Gravies	30	0.9	2.3	1.6	7	0.2	3	11	66	0.01	0.02	0.2	0.00	0.03	0
55. Salad Dressing	92	0.2	9.7	1.5	3	0.1	1	4	25	0.00	0.00	0.0	0.00	0.03	0
56. Diet Dressing	40	0.2	3.4	2.5	3	0.1	2	5	31	0.00	0.00	0.0	0.00	0.02	0
57. Spreads/Dips	50	0.0	5.6	0.0	2	0.0	0	1	228	0.00	0.00	0.0	0.00	0.00	0
58. Oils, Cooking Fat	207	0.0	23.4	0.0	0	0.0	0	0	0	0.00	0.00	0.0	0.00	0.00	0
59. Sugars, Syrup, Jellies	39	0.0	0.0	10.0	2	0.1	0	1	0	0.00	0.00	0.0	0.00	0.00	0
60. Gelatin	74	1.7	0.0	18.0	0	0.0	7	23	5	0.00	0.00	0.0	0.01	0.00	1
61. Popsicles	76	0.5	0.7	17.6	9	0.0	0	0	34	0.01	0.02	0.0	0.00	0.00	1
62. Candy	130	1.4	4.6	22.0	27	0.4	12	36	19	0.02	0.04	0.3	0.02	0.05	0
63. Sugar-Based Drinks	112	0.0	0.0	28.8	8	0.2	3	25	8	0.00	0.00	0.0	0.00	0.00	8
64. Diet Soda	0	0.0	0.0	0.0	9	0.3	3	41	0	0.00	0.00	0.0	0.00	0.00	0
65. Coffee/Tea	7	0.1	0.0	1.2	4.0	0.2	17	6	0	0.00	0.01	0.5	0.00	0.00	0
66. Alcoholic Beverages	146	0.7	0.0	10.0	14	0.1	25	68	0	0.00	0.07	1.3	0.14	0.00	0

Appendix F-1. Percent of Persons in Each Sex-Age Category with Various Protein NARs as Determined by Standard and Food Frequency Methods

Sex and Age (years)	n	Method of Determining Protein NAR	Protein NAR <.60	.60-.79	.80-1.00
			% of persons		
Males and females					
1-3	151	standard	0.0	1.3	98.7
		food frequency	0.0	0.0	100.0
4-6	179	standard	0.0	0.0	100.0
		food frequency	0.0	0.0	100.0
7-10	260	standard	0.0	0.0	100.0
		food frequency	0.0	0.4	99.6
Males					
11-14	135	standard	0.0	3.0	97.0
		food frequency	1.5	0.0	98.5
15-18	157	standard	0.6	1.3	98.1
		food frequency	1.3	3.8	94.9
19-22	115	standard	1.7	1.7	96.5
		food frequency	2.6	5.2	92.2
23-50	566	standard	0.4	1.8	97.9
		food frequency	0.9	5.0	94.2
51-69	269	standard	1.1	4.1	94.8
		food frequency	2.2	7.1	90.7
70+	117	standard	2.6	6.0	91.4
		food frequency	1.7	6.8	91.4
Females					
11-14	137	standard	0.0	0.7	99.3
		food frequency	0.0	0.7	99.3
15-18	138	standard	3.6	3.6	92.8
		food frequency	1.4	6.5	92.0
19-22	118	standard	4.2	1.7	94.1
		food frequency	3.4	4.2	92.4
23-50	751	standard	3.7	5.1	91.2
		food frequency	3.6	2.5	93.9
51-69	405	standard	3.0	3.7	93.3
		food frequency	2.7	4.2	93.1
70+	203	standard	2.5	6.4	91.1
		food frequency	2.5	5.4	92.1

Appendix F-2. Percent of Persons in Each Sex-Age Category with Various Calcium NARs as Determined by Standard and Food Frequency Methods

Sex and Age (years)	n	Method of Determining Calcium NAR	Calcium NAR <.60	.60-.79	.80-1.00
			% of persons		
Males and females					
1-3	151	standard	25.2	13.9	60.9
		food frequency	10.6	10.6	78.8
4-6	179	standard	19.6	14.0	66.5
		food frequency	8.9	12.8	78.2
7-10	260	standard	5.8	14.2	80.0
		food frequency	5.8	11.2	83.1
Males					
11-14	135	standard	20.7	18.5	60.7
		food frequency	23.0	26.7	50.4
15-18	157	standard	26.1	16.6	57.3
		food frequency	44.6	15.3	40.1
19-22	115	standard	16.5	16.5	67.0
		food frequency	33.9	20.0	46.1
23-50	566	standard	20.5	18.4	61.1
		food frequency	38.9	19.1	42.0
51-69	269	standard	27.5	20.8	51.7
		food frequency	37.6	21.2	41.3
70+	117	standard	29.1	27.4	43.6
		food frequency	27.4	21.4	51.3
Females					
11-14	137	standard	29.2	28.5	42.3
		food frequency	29.2	31.4	39.4
15-18	138	standard	53.6	17.4	29.0
		food frequency	58.7	20.3	21.0
19-22	118	standard	37.3	17.8	44.9
		food frequency	41.5	21.2	37.3
23-50	751	standard	48.6	19.4	32.0
		food frequency	50.3	20.5	29.2
51-69	405	standard	45.9	21.5	32.6
		food frequency	42.0	23.7	34.3
70+	203	standard	40.4	25.6	34.0
		food frequency	31.5	26.1	42.4

Appendix F-3. Percent of Persons in Each Sex-Age Category with Various Iron NARs as Determined by Standard and Food Frequency Methods

Sex and Age (years)	n	Method of Determining Iron NAR	Iron NAR <.60	.60-.79	.80-1.00
			%of persons		
Males and females					
1-3	151	standard	64.9	18.5	16.6
		food frequency	15.2	43.7	41.1
4-6	179	standard	5.0	25.7	69.3
		food frequency	0.0	2.2	97.8
7-10	260	standard	1.2	9.6	89.2
		food frequency	0.4	4.6	95.0
Males					
11-14	135	standard	23.0	26.7	50.4
		food frequency	23.7	47.4	28.9
15-18	157	standard	11.5	22.3	66.2
		food frequency	27.4	49.7	22.9
19-22	115	standard	2.6	6.1	91.3
		food frequency	8.7	10.4	80.9
23-50	566	standard	0.4	0.9	98.8
		food frequency	1.2	8.0	90.8
51-69	269	standard	4.1	1.5	94.4
		food frequency	5.2	7.4	87.4
70+	117	standard	0.8	5.1	94.0
		food frequency	0.8	9.4	89.7
Females					
11-14	137	standard	43.8	37.2	19.0
		food frequency	36.5	46.0	17.5
15-18	138	standard	49.3	30.4	20.3
		food frequency	50.7	36.2	13.0
19-22	118	standard	55.9	29.7	14.4
		food frequency	63.6	30.5	5.9
23-50	751	standard	57.9	25.6	16.5
		food frequency	56.2	34.6	9.2
51-69	405	standard	5.9	12.4	81.7
		food frequency	4.7	9.1	86.2
70+	203	standard	5.9	18.7	75.4
		food frequency	3.4	14.3	82.3

Appendix F-4. Percent of Persons on Each Sex-Age Category with Various Magnesium NARs as Determined by Standard and Food Frequency Methods

Sex and Age (years)	n	Method of Determining Magnesium NAR	Magnesium NAR <.60	.60-.79	.80-1.00
			% of persons		
Males and females					
1-3	151	standard	6.6	12.6	80.8
		food frequency	0.0	3.3	96.7
4-6	179	standard	10.1	19.0	71.0
		food frequency	1.7	4.5	93.8
7-10	260	standard	11.5	21.5	66.9
		food frequency	6.9	16.2	76.9
Males					
11-14	135	standard	25.9	23.7	50.4
		food frequency	34.8	29.6	35.6
15-18	157	standard	26.8	35.0	38.2
		food frequency	55.4	35.7	8.9
19-22	115	standard	24.4	33.9	41.7
		food frequency	54.8	32.2	13.0
23-50	566	standard	15.2	31.1	53.7
		food frequency	45.6	33.9	20.5
51-69	269	standard	22.7	28.2	49.1
		food frequency	40.2	33.8	26.0
70+	117	standard	25.6	31.6	42.7
		food frequency	33.3	34.2	32.5
Females					
11-14	137	standard	23.4	32.8	43.8
		food frequency	23.4	38.0	38.7
15-18	138	standard	39.1	25.4	35.5
		food frequency	41.3	34.1	24.6
19-22	118	standard	44.9	28.8	26.3
		food frequency	51.7	32.2	16.1
23-50	751	standard	39.2	27.8	33.0
		food frequency	41.5	33.8	24.6
51-69	405	standard	23.2	36.3	40.5
		food frequency	24.9	32.1	43.0
70+	203	standard	31.0	30.0	38.9
		food frequency	23.6	39.9	36.4

Appendix F-5. Percent of Persons in Each Sex-Age Category with Various Phosphorus NARs as Determined by Standard and Food Frequency Methods

Sex and Age (years)	n	Method of Determining Phosphorus NAR	Phosphorus NAR <.60	.60-.79	.80-1.00
			% of persons		
Males and females					
1-3	151	standard	6.6	13.2	80.1
		food frequency	0.7	3.3	96.0
4-6	179	standard	2.2	7.8	89.9
		food frequency	0.0	0.6	99.4
7-10	260	standard	0.8	2.7	96.5
		food frequency	0.4	1.5	98.1
Males					
11-14	135	standard	3.0	9.6	87.4
		food frequency	3.0	14.8	82.2
15-18	157	standard	3.2	6.4	90.4
		food frequency	7.6	14.6	77.7
19-22	115	standard	1.7	3.5	94.8
		food frequency	2.6	5.2	92.2
23-50	566	standard	0.2	2.5	97.4
		food frequency	1.9	5.6	92.4
51-69	269	standard	2.6	2.6	94.8
		food frequency	3.0	6.3	90.7
70+	117	standard	0.8	5.1	94.0
		food frequency	2.6	5.1	92.3
Females					
11-14	137	standard	8.8	18.2	73.0
		food frequency	7.3	15.3	77.4
15-18	138	standard	17.4	23.9	58.7
		food frequency	18.8	23.9	57.2
19-22	118	standard	7.6	5.9	86.4
		food frequency	5.1	14.4	80.5
23-50	751	standard	7.9	11.8	80.3
		food frequency	6.4	12.0	81.6
51-69	405	standard	4.7	12.6	82.7
		food frequency	4.2	8.9	86.9
70+	203	standard	3.9	9.8	86.2
		food frequency	3.9	4.4	91.6

Appendix F-6. Percent of Persons in Each Sex-Age Category with Various Vitamin A NARs as Determined by Standard and Food Frequency Methods

Sex and Age (years)	n	Method of Determining Vitamin A NAR	Vitamin A NAR <.60	.60-.79	.80-1.00
			% of persons		
Males and females					
1-3	151	standard	4.0	6.6	89.4
		food frequency	0.7	3.3	96.0
4-6	179	standard	10.1	11.2	78.8
		food frequency	4.5	8.4	87.2
7-10	260	standard	11.5	13.8	74.6
		food frequency	8.5	13.8	77.7
Males					
11-14	135	standard	25.2	14.1	60.7
		food frequency	39.3	20.7	40.0
15-18	157	standard	23.6	14.0	62.4
		food frequency	40.1	22.9	36.9
19-22	115	standard	38.3	14.8	47.0
		food frequency	62.6	13.9	23.5
23-50	566	standard	27.9	17.0	55.1
		food frequency	51.6	18.0	30.4
51-69	269	standard	27.9	13.0	59.1
		food frequency	34.6	20.4	45.0
70+	117	standard	25.6	12.0	62.4
		food frequency	31.6	20.5	47.9
Females					
11-14	137	standard	24.8	15.3	59.8
		food frequency	25.6	19.0	55.5
15-18	138	standard	36.2	10.9	52.9
		food frequency	42.0	19.6	38.4
19-22	118	standard	38.1	14.4	47.5
		food frequency	49.2	17.0	33.9
23-50	751	standard	31.7	14.9	53.4
		food frequency	39.4	16.8	43.8
51-69	405	standard	19.5	13.1	67.4
		food frequency	23.2	18.5	58.3
70+	203	standard	18.2	14.3	67.5
		food frequency	19.2	18.7	62.1

Appendix F-7. Percent of Persons in Each Sex-Age Category with Various Thiamin NARs as Determined by Standard and Food Frequency Methods

Sex and Age (years)	n	Method of Determining Thiamin NAR	Thiamin NAR <.60	.60-.79	.80-1.00
			% of persons		
Males and females					
1-3	151	standard	2.0	2.6	95.4
		food frequency	0.0	0.0	100.0
4-6	179	standard	0.6	10.1	89.4
		food frequency	0.0	0.0	100.0
7-10	260	standard	4.2	8.5	87.3
		food frequency	1.9	6.5	91.5
Males					
11-14	135	standard	4.4	12.6	83.0
		food frequency	5.9	13.3	80.7
15-18	157	standard	5.7	9.6	84.7
		food frequency	11.5	19.1	69.4
19-22	115	standard	12.2	25.2	62.6
		food frequency	28.7	32.2	39.1
23-50	566	standard	8.5	16.8	74.7
		food frequency	20.0	31.6	48.4
51-69	269	standard	8.2	13.0	78.8
		food frequency	10.8	18.2	71.0
70+	117	standard	7.7	12.0	80.3
		food frequency	6.8	16.2	76.9
Females					
11-14	137	standard	2.9	8.8	88.3
		food frequency	0.7	7.3	92.0
15-18	138	standard	14.5	18.8	66.7
		food frequency	10.9	22.5	66.7
19-22	118	standard	24.6	15.2	60.2
		food frequency	19.5	24.6	55.9
23-50	751	standard	19.8	15.2	65.0
		food frequency	14.8	18.8	66.4
51-69	405	standard	12.6	16.3	71.1
		food frequency	8.9	12.8	78.3
70+	203	standard	7.4	14.3	78.3
		food frequency	4.4	8.9	86.7

Appendix F-8. Percent of Persons in Each Sex-Age Category with Various Riboflavin NARs as Determined by Standard and Food Frequency Methods

Sex and Age (years)	n	Method of Determining Riboflavin NAR	Riboflavin NAR <.60	.60-.79	.80-1.00
			% of persons		
Males and females					
1-3	151	standard	0.7	2.6	96.7
		food frequency	0.0	0.0	100.0
4-6	179	standard	0.6	2.2	97.2
		food frequency	0.0	0.6	99.4
7-10	260	standard	0.8	5.4	93.8
		food frequency	1.9	1.9	96.2
Males					
11-14	135	standard	1.5	5.2	93.3
		food frequency	3.0	8.9	88.2
15-18	157	standard	3.8	7.0	89.2
		food frequency	11.5	15.3	73.2
19-22	115	standard	9.6	14.8	75.6
		food frequency	22.6	25.2	52.2
23-50	566	standard	5.8	9.5	84.6
		food frequency	17.5	25.1	57.4
51-69	269	standard	6.3	10.4	83.3
		food frequency	12.3	16.7	71.0
70+	117	standard	9.4	7.7	82.9
		food frequency	6.8	13.7	79.5
Females					
11-14	137	standard	0.7	7.3	92.0
		food frequency	2.2	7.3	90.5
15-18	138	standard	8.0	9.4	82.6
		food frequency	8.0	15.2	76.8
19-22	118	standard	17.8	13.6	68.6
		food frequency	22.0	15.2	62.7
23-50	751	standard	14.4	15.6	70.0
		food frequency	14.5	19.0	66.4
51-69	405	standard	12.1	12.8	75.1
		food frequency	10.1	11.6	78.3
70+	203	standard	5.9	8.9	85.2
		food frequency	4.9	9.8	85.2

Appendix F-9. Percent of Persons in Each Sex-Age Category with Various Vitamin B6 NARs as Determined by Standard and Food Frequency Methods

Sex and Age (years)	n	Method of Determining Vitamin B6 NAR	Vitamin B6 NAR <.60	.60-.79	.80-1.00
			% of persons		
Males and females					
1-3	151	standard	3.3	28.5	68.2
		food frequency	0.7	17.9	81.5
4-6	179	standard	0.6	21.8	77.6
		food frequency	0.0	14.5	85.5
7-10	260	standard	1.5	22.3	76.2
		food frequency	0.0	13.8	86.2
Males					
11-14	135	standard	3.0	23.7	73.3
		food frequency	0.0	16.3	83.7
15-18	157	standard	3.2	31.2	65.6
		food frequency	0.0	27.4	72.6
19-22	115	standard	4.4	36.5	59.1
		food frequency	0.9	29.6	69.6
23-50	566	standard	2.6	33.0	64.3
		food frequency	0.4	27.7	71.9
51-69	269	standard	4.1	24.2	71.8
		food frequency	0.4	24.5	75.1
70+	117	standard	6.0	17.1	76.9
		food frequency	1.7	19.7	78.6
Females					
11-14	137	standard	2.9	29.9	67.2
		food frequency	0.7	21.9	77.4
15-18	138	standard	5.8	27.5	66.7
		food frequency	0.7	23.2	76.1
19-22	118	standard	1.7	37.3	61.0
		food frequency	0.8	27.1	72.0
23-50	751	standard	3.3	31.2	65.5
		food frequency	0.5	27.6	71.9
51-69	405	standard	1.5	20.2	78.3
		food frequency	0.2	15.3	84.4
70+	203	standard	2.0	16.3	81.8
		food frequency	0.5	15.3	84.2

Appendix F-10. Percent of Persons in Each Sex-Age Category with Various Vitamin B12 NARs as Determined by Standard and Food Frequency Methods

Sex and Age (years)	n	Method of Determining Vitamin B12 NAR	Vitamin B12 NAR <.60	.60-.79	.80-1.00
			% of persons		
Males and females					
1-3	151	standard	4.0	7.3	88.7
		food frequency	0.7	2.0	97.4
4-6	179	standard	2.8	7.3	89.9
		food frequency	0.0	1.1	98.9
7-10	260	standard	3.1	6.5	90.4
		food frequency	1.5	2.7	95.8
Males					
11-14	135	standard	2.2	4.4	93.3
		food frequency	1.5	2.2	96.3
15-18	157	standard	3.2	2.6	94.3
		food frequency	1.9	7.0	91.1
19-22	115	standard	5.2	7.8	87.0
		food frequency	6.1	9.6	84.4
23-50	566	standard	2.8	4.4	92.8
		food frequency	6.2	12.5	81.3
51-69	269	standard	7.1	10.8	82.2
		food frequency	7.8	11.2	81.0
70+	117	standard	10.3	13.7	76.1
		food frequency	8.6	12.0	79.5
Females					
11-14	137	standard	4.4	5.1	90.5
		food frequency	2.9	5.8	91.2
15-18	138	standard	9.4	13.8	76.8
		food frequency	10.9	7.2	81.9
19-22	118	standard	20.3	19.5	60.2
		food frequency	19.5	11.9	68.6
23-50	751	standard	18.5	15.8	65.6
		food frequency	13.6	15.2	71.2
51-69	405	standard	20.2	13.8	65.9
		food frequency	11.4	12.6	76.0
70+	203	standard	21.2	17.7	61.1
		food frequency	13.8	17.7	68.5

Appendix F-11. Percent of persons in Each Sex-Age Category with Various Vitamin C NARs as Determined by Standard and Food Frequency Methods

Sex and Age (years)	n	Method of Determining Vitamin C NAR	Vitamin C NAR <.60	.60-.79	.80-1.00
			% of persons		
Males and females					
1-3	151	standard	23.2	7.3	69.5
		food frequency	8.0	12.6	79.5
4-6	179	standard	19.6	5.0	75.4
		food frequency	7.8	7.3	84.9
7-10	260	standard	6.9	4.2	88.8
		food frequency	3.1	8.1	88.8
Males					
11-14	135	standard	3.7	11.1	85.2
		food frequency	8.9	20.0	71.1
15-18	157	standard	15.3	9.6	75.2
		food frequency	15.9	17.8	66.2
19-22	115	standard	23.5	9.6	67.0
		food frequency	32.2	12.2	55.6
23-50	566	standard	21.7	11.0	67.3
		food frequency	31.3	15.9	52.8
51-69	269	standard	20.1	10.4	69.5
		food frequency	26.8	15.6	57.6
70+	117	standard	23.1	10.3	66.7
		food frequency	29.1	8.6	62.4
Females					
11-14	137	standard	13.1	9.5	77.4
		food frequency	9.5	8.8	81.8
15-18	138	standard	29.7	15.9	54.4
		food frequency	29.7	19.6	50.7
19-22	118	standard	34.8	7.6	57.6
		food frequency	34.8	18.6	46.6
23-50	751	standard	34.0	11.0	55.0
		food frequency	33.4	15.4	51.1
51-69	405	standard	17.3	8.9	73.8
		food frequency	20.2	10.9	68.9
70+	203	standard	17.7	8.9	73.4
		food frequency	20.2	11.3	68.5

Appendix F-12. Percent of Persons in Each Sex-Age Category with Various MAR11s as Determined by Standard and Food Frequency Methods

Sex and Age (years)	n	Method of Determining MAR11	MAR11 <.60	.60-.79	.80-1.00
			% of persons		
Males and females					
1-3	151	standard	2.0	15.2	82.8
		food frequency	0.0	2.6	97.4
4-6	179	standard	1.7	6.7	91.6
		food frequency	0.0	2.2	97.8
7-10	260	standard	0.4	8.8	90.8
		food frequency	0.4	3.8	95.8
Males					
11-14	135	standard	1.5	15.6	83.0
		food frequency	3.7	23.0	73.3
15-18	157	standard	2.6	15.3	82.2
		food frequency	8.9	32.5	58.6
19-22	115	standard	3.5	18.3	78.3
		food frequency	13.0	29.6	57.4
23-50	566	standard	1.1	14.5	84.4
		food frequency	6.7	33.6	59.7
51-69	269	standard	3.7	16.4	79.9
		food frequency	8.2	21.2	70.6
70+	117	standard	5.1	16.2	78.6
		food frequency	6.0	19.7	74.4
Females					
11-14	137	standard	2.9	21.2	75.9
		food frequency	2.9	21.2	75.9
15-18	138	standard	14.5	31.2	54.4
		food frequency	14.5	35.5	50.0
19-22	118	standard	15.2	28.8	55.9
		food frequency	18.6	35.6	45.8
23-50	751	standard	13.8	33.3	52.9
		food frequency	14.6	33.2	52.2
51-69	405	standard	5.9	22.7	71.4
		food frequency	5.2	18.3	76.5
70+	203	standard	2.5	22.2	75.4
		food frequency	3.4	15.8	80.8